Food Manufacture

Incorporating Canning, Packing, and Preserving

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The Manchester Conference.

NOW THAT the rush of the Canners' Conference at Manchester is over, one is able to sit back and review one's impressions. In several respects it was an improvement on last year's event at Leicester—more people attended; there was a livelier note of interest and a more buoyant display of optimism; there was a general feeling that initial difficulties had been overcome and that a promising new enterprise in industry had been successfully launched, and, not least, there was a much more numerous and varied exhibition of British made machinery and equipment.

No fault is to be found with the housing and arrangement of the exhibits, nor with Mr. Packer's very able organisation of the meetings and social functions. We did, however, hear the thought expressed by several visitors that something more might have been done to make people known to one another and to infuse a little more warmth into the entertainments. It is true, no doubt, that people are apt to stand about and freeze unless they are herded together and intermingled, especially when the time for "making contacts" is very limited. If no one can be found who is capable of performing this "shepherding" function, it might be a good plan for each visitor to pin a card on his coat bearing the names of himself, his firm, and the town from which he hails. As a matter of fact, a procedure of this kind is adopted at one of the London clubs—with excellent results, we are told.

Service.

On the other hand, it is doubtful if it is to be considered good policy to exclude the technical Press from attendance at the various conferences. As a matter of general principle, most people are of the opinion that it is definitely bad, and especially so when not uniformly applied. It is generally understood that the primary function of the technical journal is to promote the interests of the particular industry which it serves by collecting information from a variety of sources and distributing such portions of it as are considered to be useful to members of the industry. Obviously, if the sources are bottled up there is nothing to be distributed and the industry *as a whole* suffers, and this is bad for everybody concerned.

We would go so far as to assert that the rate of industrial progress depends on how rapidly new ideas, and information generally, are spread. Progress is based almost entirely on the interchange of ideas. History shows that discoveries are due to a handful of exceptional men; suppose they had kept their knowledge to themselves! Imagine the predicament in which industry would find itself were all the printing presses of the world smashed up and the technical journals put to bed! Originally, industry was largely a matter of secrets; nowadays the status of any branch may be said, more or less, to be directly related to its degree of secretiveness. Accordingly, we deplore any tendency to secretiveness shown by the food industry. It was with these thoughts at the back of our mind that we were first led on to the idea of founding the Society of Food Industry.

Canned Chicken.

At the excellent luncheon, given on November 4, by Messrs. Mather and Platt, Ltd., the possibilities attaching to the canning of chicken were forcibly brought home to those present in the course of the

inspiring addresses of Sir Edgar Jones and the Lord Mayor of Manchester. Since then the truth of our remarks in a letter to *The Times* of the same date has been given support by the requests we have re-received for sources of reliable advice on the question of how to set about the business. What are the pitfalls (if any) and just what are the details of processing involved? This position should have been foreseen years ago so that reliable data and guidance would have now been at the free disposal of everybody, thus avoiding waste of time and money in individual experiments.

The subject is discussed on another page and a second article will appear in next month's issue. As regards American practice, some particulars were given in the April and March issues of last year. In one of the American works on canning we note that directions are given for the canning of roasted chicken, chicken in jelly, and stewed chicken. The processing temperature is given as 250° F., 1-lb. cans for 55 minutes and 2-lb. cans for 65 minutes.

Spoilage by Sugar.

Canners would do well to keep in mind the work done by E. J. Cameron, of the research laboratories of the National Canners' Association, on the thermophilic spoilage bacteria in granulated sugar. This work was prompted by the discovery in 1926 that refined sugar carries thermophilic spoilage bacteria. This fact was arrived at during the study of an outbreak of spoilage in canned peas.

The main results of the researches are as follows: It is considered established that the bacterial condition of commercial sugar has a very definite relation to the thermophilic spoilage problems of the canner. Sugar, while not the only source, is considered the outstanding source of the original infection of the canning factory.

The contamination is usually indirect; the sugar may contaminate wooden brine tanks or other equipment, and there develop. It may also be direct, as when numerous resistant spores of flat sour, etc., are contained in the sugar.

Furthermore, the bacterial condition of sugar is of importance only for the non-acid and semi-acid products in which the sugar is used. Contamination may, of course, spread to other products in which sugar is not used, if the same equipment is employed. Acid products are not affected. There is no difference in the above respects between refined cane sugar and white beet sugar.

Sugar Confectionery.

It is interesting to take stock of the position which sugar confectionery manufacturing occupies in relation to applied science. Enquiries we have recently instituted were extended to America and the Continental countries, and the results are extraordinarily disappointing. In the first place, the only book which makes any pretence of discussing the subject from a rational, scientific standpoint is Dr. Jordan's *Confectionery Problems* (1930). This book makes an excellent beginning, but it is merely a first step in the right direction, and by getting down to fundamentals it cannot fail to dissipate many false notions and set the reader in the correct attitude of approaching the subject.

In a foreword Dr. Hutchins, of the National Confectioners' Association, states that "Confectionery manufacture is one of our oldest industries, and, unlike many others, has been largely a family affair, in so far as individual units are concerned. Business and pertinent facts concerning it have been handed down from father to son, and many simple facts were at one time regarded as valuable secrets. . . . A hitherto false sense of security, due to an idea that secrecy is ample protection against competition, is being replaced by the realisation that substantial and enduring progress can only come as a result of exact knowledge. This can only be attained by mastery of facts and extension of knowledge through a sound programme of research. Candy literature is meagre and much that is available consists of recipes and formulæ, while the few published researches are scattered through various technical journals."

The Carbohydrate Division.

Thus, even in America, the position is not much better than it is here. We do find, however, signs of some attempt at rectifying deficiencies. Thus, at the Carbohydrate Division of the U.S. Department of Agriculture, under the direction of H. S. Paine, useful work has already been carried out. Mr. Paine informs us that "The work of the Carbohydrate Division includes researches on a great variety of specific subjects relating to the production and utilisation of carbohydrates. In a general way, the object is to apply chemistry and chemical technology, whenever possible, to facilitate the production and use of those agricultural resources the value of which is determined largely by their carbohydrate content. The specific research projects of the Division include chemical and chemical-technological problems on the production and utilisation of sugar and syrup crops, such as sugar cane, sugar beets, sorghum cane, including also maple products, honey, and starch and starch derivatives from corn, potatoes, and other starchy plants, and in addition the investigation of the carbohydrates of many other plants with a view to their more profitable production and use." Judging from the photographs before us, the laboratories are well equipped both for purely laboratory work and for experimenting under semi-factory conditions.

Work Done.

The Division is best known in connection with originating the use of invertase in fondant goods for the purpose of inhibiting crystallisation, U.S. Patent 1,437,816 having been granted to Paine and Hamilton and dedicated to public use without payment of royalty. Other patents relating to fondant and emanating from the Division have been assigned to the public.

Work has also been carried out on the cause of "bursting fermentation," on methods of preventing "leakers" in fondant goods, and on the influence of various conditions of cold storage on chocolate-coated confections.

The results of investigations have been presented in a number of papers; Paine has written on scientific progress in the sugar confectionery industry and on the physics and chemistry of fondants along with John Hamilton, who has written a paper on "Experimental Candy Batch Manufacture," while J. A. Ambler has contributed several papers on colour problems and the use of colours in sugar confectionery. Ambler also wrote an article on "The Candy Test for Sugars." Most of these articles appeared in *The Manufacturing Confectioner*. In 1927, Church, Paine, and Hamilton published a paper in *Jour. Ind. Eng. Chem.* (p. 353) on "Sugar-Tolerant Yeasts in Chocolate-Coated Creams."

The Mellon Institute.

Another investigator who has rendered valuable service is Dr. W. W. Duecker, of the Mellon Institute of Industrial Research. In the course of correspondence Dr. Duecker notes that, "People who are interested in the manufacture of confections have tried to find trustworthy scientific information which would aid them in the problems they encounter. Unfortunately, however, there seems to be a lack of scientific information which can be applied by the confectioner. During the time that I was engaged in a study of the application of gelatine to the confectionery industry, I searched the literature for articles and for information which might prove useful in this research."

Dr. Duecker is best known for his work on edible gelatine and marshmallows. His contributions, in the form of articles, include "Influence of Gelatine on Sugar Crystallisation"; "The Production of Marshmallows"; "The Colloid Chemistry of Gelatine and Starch Mixtures"; "Factors that Control the Keeping Qualities of Confectionery"; and "The Influence of Humidity on Marshmallows" (*Mf. Conf.*, 1926, 1927, 1930).

Apathy.

Turning to the Continent, we have been unable to obtain evidence of any useful, fundamental work. In 1927, Josef Stark, of Salzburg in Austria, brought out a small book dealing with the manufacture of sugar confectionery, and it is well illustrated with examples of modern machinery.

At home we are met with a bewildering blast of recipes and nostrums which would confound even Mrs. Beeton herself—supposing she were alive to-day. There is little hope for intelligent youth anxious to assimilate the general principles underlying these recipes and the reasoning at the back of the nostrums. It is surprising that, under these primitive conditions, the industry makes any advance at all, but it is not surprising that the facilities for technical education along the lines adopted in every other branch of manufacturing are practically non-existent.

A Start.

Needless to say, an effort to promote research and organised education will be one of the first things to be taken up by the Society of Food Industry. Meanwhile, we have tried to start the ball rolling.

In order to place oneself in a position of bringing the whole subject into proper perspective and as a first step in correlating the tangle of recipes and factory processes, it is obviously necessary to arrange the various sugar confectionery raw materials, processes, and products in a logical scheme of classification. When this is done it should be possible to gain a comprehensive view of the subject, to separate out the essentials and unearth the underlying principles that really matter, to get some idea of how things are related to one another, to comprehend the reasons of using or doing this or that, and, generally, to clarify one's mental muddle preparatory to formulating plans for further researches. In this way only can one build up a permanent structure of organised and easily assimilable knowledge and provide a skeleton into which may be fitted further data as they are gradually accumulated by systematic research.

A Scheme of Classification.

With these thoughts we looked round for someone with factory experience and an analytical turn of mind to undertake the task of classification, and eventually hit upon Mr. Lionel Robertson, who has produced the results recorded on page 348. The author desires it to be known that he does not claim that this scheme of classification is exhaustive or incapable of improvement. It is, in fact, intended to represent a first attempt to provide a basis for discussion with a view to subsequent modification. Accordingly, we join with him in inviting suggestions and criticism.

Brewers' Exhibition.

One of the largest and most interesting sections of this year's exhibition was devoted to mineral waters and soda fountain and iced soft drinks. This side of the industry is one that is showing greatly increased activity in this country, so much so that America has now much to learn from us regarding these matters, it is said.

The exhibition demonstrated another modern tendency. Public houses are becoming brighter and assuming more of the cosy café or club aspect, where entertainment, food, and soft drinks may be obtained under attractive conditions. It is clear that the day of the purely beer-drinking "pubs" and "gin-palaces" is over.

Grain Exhibition.

The World's Grain Exhibition and Conference, which was originally intended to be held at Regina, Saskatchewan, in 1932, will be postponed to 1933, and will open on July 24 for a period ending on August 5. Representatives from some thirty countries had planned to attend the event.

Making Good!

Dr. Klein, of the Department of Commerce, Washington, recently delivered a radio-talk on "America's Sweet Tooth," in the course of which he stated that he had received the following letter from a couple of small schoolgirls in the Middle West: "We have seen in the paper where you issued a statement saying that every man, woman, and child in the country ate twelve pounds of candy last year. We didn't get ours. Will Uncle Sam please send it to us—right now? Thanks ever so much.—Yours very truly, HENRIETTA ROBINSON and ETHEL JONES."

The Corn Cure.

We observe that Mr. Whymper has hurled himself into the dextrose battle now raging in the States. The trouble arises out of disagreement among the chocolate high priests as to whether or not it is an advantage to incorporate anhydrous dextrose in chocolate. As one would expect, Mr. Whymper is thoroughly at home in a battle of wits such as this, and he has "let himself go all out" in a contribution to an American contemporary. His general conclusion is that anhydrous dextrose has to-day valuable, if limited, application in certainly one department of chocolate manufacture.

Revenge!

It was reported in the daily Press the other day that "The proprietor of a provision shop at Gelsenkirchen, in the Ruhr, entered his shop one morning recently to find the body of a man suspended from a skylight by a sausage—presumably one of those large looped sausages which are to be seen in all German provision shops.

"Police enquiries have shown that the man was a burglar who had entered the shop through a skylight, made a hearty meal, and then filled his pockets with sausages before escaping. In trying to squeeze through the skylight he apparently slipped and fell back. As he did so one of the sausages looped itself round his neck, caught on a projection, and hanged the man."

Skim Milk in Baking.

The increasing amount of dry skim milk now being used by bakers is making the substance one of importance to the cereal chemist. Although primarily the addition of milk solids to bakers' products was brought about by consideration of the enhanced nutritive value imparted to the foodstuffs, it has been since discovered that the dry milk, if properly prepared, appreciably improves the bread quality when added as a dough ingredient. It is not surprising, therefore, to find that numerous investigations have been carried out on the subject. It must be remembered that milk may be altered both physically and chemically by being subjected to heat, and, as the production of milk powder involves heating for pasteurisation and concentration, the influence of heat on the final product is of great importance. This point has been studied carefully by the manufacturers of skim milk and the optimum conditions have now been ascertained.

In 1927 Greenbank and his colleagues (*J. Dairy Sci.*, vol. 10, p. 335) demonstrated that if fluid milk was heated previous to being dried the product was improved from a baking standpoint, and the viscosity of a water suspension of this milk powder was increased. Later, Grewe (*Cereal Chemistry*, vol. 5, p. 255) found that the colour of the crumb was more creamy and more glossy as a result of the use of dry skim milk, and also the large proportion of lactose present brought about a beautiful golden crust colour. Then Grewe and Holm reported an improved product in respect to baking quality due to pre-heating the fluid milk. The dry milk was prepared by heating the milk for half an hour at temperatures between 50 and 100° C. The milk was then dried by the spray system, being forced into the drying chamber at 1,800 to 2,500 lbs. pressure. The temperature was maintained at 160° C. They noted a bigger improvement in the case of soft winter wheat flour than hard winter wheat flour. The latest contribution to the subject is a paper by O. Skovholt and C. H. Bailey in the current number of *Cereal Chemistry* (vol. 8, p. 374), and again the improvement produced by the pre-drying of the milk is emphasised. Bakers would do well to give careful consideration to the possibilities of dry skim milk.

A Classification of Sugar Confectionery

By LIONEL ROBERTSON

As already pointed out on page 345, the following is the result of a suggestion which we made to the author to work out a scheme of classification for sugar confectionery, with the object of enabling one to correlate the multitude of products, raw materials, and processes, to facilitate the elucidation of fundamental principles, and, generally, to clarify the present mental muddle. The author's scheme does not, of course, claim to be anything more than a first attempt in this direction. It is intended to serve as a basis for discussion and subsequent modification, and, accordingly, we would welcome suggestions and criticism.

WITH SUCH an involved subject as sugar confectionery it is extraordinarily difficult to select a basis for classification of its products. There are at least four different aspects from which the problem can be approached—viz., composition, temperature, texture, and trade terms. The last-named may be discarded at the very outset on account of the misleading names given to many lines. After careful consideration, it has been decided to deal primarily with composition in outlining the main classes, and to introduce groups and sub-groups where necessary to indicate differences in temperature or consistency or both. Actually composition is the only reliable guide, as it is in the main constant for any one particular type of goods (variations in detail are of course numerous), and in many cases a perfectly fair average formula can be given. As regards temperature and consistency, these are largely the preferences of individual makers, and can be varied quite considerably without unduly affecting the finished article.

Sugar has been taken as the basis of this classification, for it is to all intents and purposes universal in sweet making. Glucose is, of course, used almost as extensively as sugar, and it is therefore selected as the secondary base. The third basic ingredient selected is fat, and this term is intended to cover all types of oil and fat, whether animal or vegetable, and includes, among other substances, condensed, block, and powdered milk and all the various proprietary blendings. No differentiation has been attempted between these various classes of fat, principally because of their frequent interchangeability and also because the flavour required in the manufactured article will to a great extent determine the specific type to be used.

In order to simplify the classification as much as possible a large number of substances have been included as the fourth base, and they have been collectively termed "some jellying substance." Gelatine, isinglass (or Japanese gelatine), and gum are the principal ones, but maize starch powder, wheat flour, gum chicle are also included, as well as (under certain conditions) pectin and fresh fruit. Albumen has also been included, though perhaps this is open to dispute.

The last base is headed "some binding agent," and gelatine, gum (arabic, Senegal, and tragacanth), cream (boiled sugar and glucose), glucose, and, occasionally, albumen, are the principal ingredients. These are, of course, used with icing sugar and not crystal as elsewhere.

One class has been left open to receive any such confections as do not readily fall into the other classes. There are probably many different opinions as to what should be included here and what should not, but it is felt that the smaller an indefinite class of this description can be left the less likelihood there is of confusion, and, therefore, where any goods can be brought into an earlier class, even if it entails stretching a point to some extent, this has been done in preference to enlarging Class VI.

It will be seen that each class is divided into groups and sub-groups, and representative examples have been given throughout to illustrate the average nature of the ingredients, but it must be distinctly understood that these examples do no more than indicate the type of such goods.

Class I. Crystal Sugar (no Glucose).

This class, naturally, divides itself into two groups —boiled goods and pan goods. Group (*a*) can be further simplified in consideration of temperature, high boilings and low boilings giving very different results. High boilings with the grain broken by either an acid (acetic, citric, or tartaric) or by cream of tartar are principally, if not entirely, limited to the so-called crystal boilings and those boilings which must withstand considerable climatic variations, particularly where intended for export.

Low boilings can be split into two sub-groups—*i.e.*, (1) those which are creamed and with the grain broken with an acid (generally acetic) and (2) those which are allowed to crystallise out to some degree. In the first of these sub-groups we have fourrés and certain fondants, while in the second are liqueurs, in which the crust is formed by the surface crystallisation, leaving a syrup within.

It was originally intended to include in group (*b*) all classes of pan goods, but it has been finally decided, to prevent any possible misunderstanding, to deal here solely with those which contain sugar only. It is, however, thought to be quite permissible and within the scope of this group to include goods

Sugar Confectionery Classification

CLASS I. Crystal Sugar	(*a*) BOILED GOODS	1. High Boiled			*Export Boilings, Crystal Boilings*
		2. Low Boiled	1. Creamed		*Fourrés*
			2. Crystalline		*Liqueurs*
	(*b*) PAN GOODS	1. Sugar only			*Nonpareils, Shot, Balls, Pearls*
		2. With Nuts			*Sugared Almonds*
CLASS II. Crystal Sugar and Glucose	(*a*) HIGH BOILED	1. Clear	1. Plain		*General Boilings, Fancy Rocks*
			2. With Nuts		*General Nut Boilings*
		2. Aerated			*Some Boilings, Lettered Rock*
	(*b*) LOW BOILED	1. Wholly Creamed	1. Plain		*Fondants, Centres*
			2. With Nuts		*Hazelnut Creams, etc.*
		2. Partially Creamed			*Cheap Creams*
		3. With Cream and Almonds added			*Marzipan*
CLASS III. Crystal Sugar, Glucose, and Fat	(*a*) HIGH BOILED	1. Alone			*Butter Boilings*
		2. With Nuts			*Butter Goods (dipped)*
	(*b*) MEDIUM BOILED	1. Alone			*Toffee, Certain Caramels*
		2. With Caramel Paste			*Caramels*
		3. With Nuts			*Nut Toffee, Nut Caramels*
	(*c*) LOW BOILED	1. Alone			*Candy*
		2. With Nuts			*Fudge, Some Caramels*
CLASS IV. Crystal Sugar, Glucose, and some Jellying Agent	(*a*) WITH GELATINE	1. Alone	1. Clear		*Cheap Jellies, Jujubes, Table Jellies*
			2. Aerated		*Sponge*
		2. With other Materials	1. Fruit		*Pastilles*
			2. Gum	1. Long Stoving	*Bright Gums*
				2. Short Stoving	*Fruit Gums*
			3. Isinglass		*Certain Fruits*
	(*b*) WITH ISINGLASS	1. Alone			*Cordials*
		2. With Fruit			*Certain Fruits*
	(*c*) WITH OTHER AGENTS	1. Starch			*A.B. Goods, Starch-filled Goods*
		2. Pectin			*Certain Fruits, Certain Centres*
		3. Wheat Flour			*Turkish Delight*
		4. Albumen	1. Low Boiled		*Marshmallow*
			2. High Boiled		*Nougat*
		5. Gum Chicle			*Chewing Gum*
CLASS V. Icing Sugar and some Binding Agent	(*a*) GUM ARABIC	1. Alone			*Certain Lozenges*
		2. With added Glucose			*Coltsfoot Rock, etc.*
		3. With Liquorice			*Semi-Medicated and Cough Lozenges*
		4. With any other Ingredient			*Certain Lozenges*
	(*b*) GUM TRAGACANTH	1. Alone			*Medicated Lozenges, Perfumed Cachous*
		2. With Gelatine			*Plain Paste, Cheap Lozenges, Certain Cachous*
	(*c*) GELATINE	1. Alone			*Plain Paste*
		2. With Gum Arabic			*Certain Lozenges*
		3. With Fat			*Cream Paste*
	(*d*) CREAM	1. With Gelatine			*Cream Paste, Cream Cachous*
		2. With Gelatine and Fat			*Cream Paste*
		3. With Coconut			*Japwork*
CLASS VI. Other Confections	(*a*) LIQUORICE, etc.				*Liquorice Pieces, Sheets, etc.*
	(*b*) CLASSES I. AND II.				*Boiled Centred Pan Goods*
	(*c*) CLASSES I. AND IV.				*Jelly Centred Pan Goods—Jelly Beans*
	(*d*) CLASSES II. AND V.				*Satins, Pralines, etc.*

in which the centre is of a raw material nature, such as sugared almonds. The fact that there is some slight percentage of flour present in these has been ignored, as this actually is only included to facilitate manufacture and in no way affects the actual composition. All pan goods having manufactured centres —other than liqueurs—will be found in Class VI. under various groups.

Class II. Crystal Sugar and Glucose.

This is really the least complex of all, comprising as it does only two types of goods. The composition, too, is, on the whole, quite simple, though the proportions in different lines may vary from one of glucose and twelve of sugar to equal parts of each. Particularly in the first group is this difference to be noted. The range of temperature here is also considerable, 310° F. being common, while 290° F. is not uncommon. All temperatures between these two are used to some extent.

Clear boilings and aerated or pulled goods are separated, not on account of any disparity in composition (though too large a proportion of sugar in pulled goods is unwise), but rather because of the difference in texture which appears on aeration. Again, in sub-group (1), the nuts make but little difference, but it is distinctly a different type of sweetmeat.

Group (*b*) has been subdivided according to the process of manufacture rather than to composition; chemically, sub-groups (1) and (2) are identical. The difference lies in the fact that the first is composed of creamed boilings only, while the second comprises clear boilings of sugar and glucose with a certain quantity of cream added.

The third sub-group is entirely different in nature from the others, being a clear-boiling, with cream and ground almonds added to it. It must not be assumed that this is any more than variation of the group, for actually it is a somewhat unusual method of making marzipan.

Class III. Crystal Sugar, Glucose, and Fat.

This class, comprising a very large number of lines, is, nevertheless, easily divided into three groups according to boiling temperatures — *i.e.*, High, Medium, and Low. These temperatures are, however, uniformly higher than is the case in Class II. "High" is taken as being over 300° F., "medium" as 260° F. to 300° F., and "low" as less than 260° F.

In the high boiled group we have two sub-groups, those containing just butter or some other fat (and, though not a fat in any sense of the word, malt may be included, for its action is very similar), the ordinary butter balls, drops, etc. The second sub-group contains the dipped goods, generally having whole-nut centres. It should be noted that this group generally contains not more than one variety of fat, and more often than not it is butter, though, of course, some lines have other fats instead.

The medium boiled group is, undoubtedly, the most extensive single group in this classification, containing, as it does, practically every type of toffee and caramel. It would be very difficult to give even an approximate type formula for any of the three sub-groups, so many different grades of sugar and fat being used and in such widely varying proportions. The first sub-group contains all varieties of plain toffees and also those caramels which contain no caramel paste. In the majority of cases two or three different grades of sugar are used, and generally at least two varieties of fat. The proportions depend entirely on the colour and consistency required in the finished article. The second sub-group is very simple, comprising only those caramels made with caramel paste. Here again, of course, there are many different grades of sugar and fat in use. All toffees and caramels containing nuts are included in sub-group (3).

The low boiled group has only two sub-groups, the first comprising candies with no nuts, and the second the remaining candies and fudge, and also a small number of special soft caramels. These last are used almost exclusively as centres for chocolates.

Class IV. Crystal Sugar, Glucose and some Jellying Agent.

In this class a very real difficulty has been encountered, in so far as many substances contain more than one jellying agent. The result is that one of these must be chosen as the basis of the class, and as far as possible the others must be grouped round it. Gelatine has been chosen as the principal jellying agent, and there will probably be little question as to this choice. The only other agent sufficiently important to head a group is isinglass, all the others being grouped together under one heading.

Group (*a*) is composed of all those types of confectionery of a jelly nature which contain gelatine, and it is split into two sub-groups, the first where gelatine is the sole agent and the second where there is a subsidiary agent as well. Sub-group (1) is easily split again into two sections, the first comprising clear jellies only—*i.e.*, jujubes, table jellies, and a large portion of the cheap jellies—while the second section contains the same raw materials aerated by whisking—*i.e.*, sponge. Sub-group (2) is split into three sections—viz., (*a*) containing gelatine and fruit, *i.e.*, pastilles; (*b*) containing gelatine and gum (arabic or occasionally Senegal), this being further split into two sub-sections, long stoving, producing bright gums, and short stoving, giving fruit gums (these two lines are not in any way made to the same formula and must not be confused with each other); and (*c*) containing gelatine and isinglass. The proportions in this last section vary considerably, and many different results may be obtained, and it is for this reason that the somewhat loose term "certain fruits" is used.

Group (*b*) is quite straightforward, containing isinglass jellies (or cordials), and, secondly, a further sub-group which again has been labelled "certain fruits." It is impossible either in this case or in the last section of group (*a*) to be more explicit, because there is an almost endless variety of formulæ in use, each one having its own votaries, yet, with very rare exceptions, they can all be lumped together into these two types.

Group (*c*) is split into five sub-groups, headed

respectively, starch, pectin, wheat flour, albumen, and gum chicle. The first of these sub-groups contains all the so-called American gums or A.B. goods, these being known collectively as "starch-filled goods." The second contains certain fruit jellies and centres. At present this is a very small group and largely in the experimental stage of development, but undoubtedly in the future it will rank as a very large part of the jelly side of sugar confectionery. The third sub-group is composed entirely of Turkish delight. There are many formulæ for these lines which do not correspond with this group, but all the best quality delights should be made with wheat flour. The fourth contains two sections, low boiling and long whisking giving marshmallow, while high boiling and the whisking of one portion only—*i.e.*, the albumen and a small quantity of low boiled syrup—gives nougat. This latter must not be confused with cream nougat, which is more in the nature of stiffened marshmallow. The fifth, and last, sub-group comprises only chewing gum, a comparatively new line to English manufacturers. Gum chicle is, of course, entirely different to gum arabic or gum tragacanth.

Class V. Icing Sugar with some Binding Agent.

In this class the basic ingredient is icing sugar. In most cases where no particular grade is mentioned, any reasonably fine sugar is used, providing that it contains not less than 40 per cent. extra fine or No. 1 grade and not more than 20 per cent. fine castor, the remaining 40 per cent. medium grade icing. Where a hard lozenge is indicated No. 1 icing is of course universal, the mixture mentioned being inclined to give a spongy paste, turning chalky with drying. In dealing with this class No. 3 icing will be used to denote a mixture, No. 2 being intermediate or fine grade, No. 1 will be extra-fine.

Group (*a*) has gum arabic (or Senegal) as its binding agent, and is divided into four sub-groups. Sub-group (1) includes only those lozenges in which no other binding agent is used. A few medicated lozenges come under this heading. Sub-group (2) has glucose as its subsidiary and coltsfoot rock and similar machine lines are outstanding examples. Sub-group (3) contains practically all the semi-medicated lozenges in which liquorice is employed and also nearly all cough lozenges, both hand and machine made. Sub-group (4) has very few components, being limited to medicated lozenges where gum tragacanth is the secondary binding agent. No. 1 icing is used throughout group (*a*).

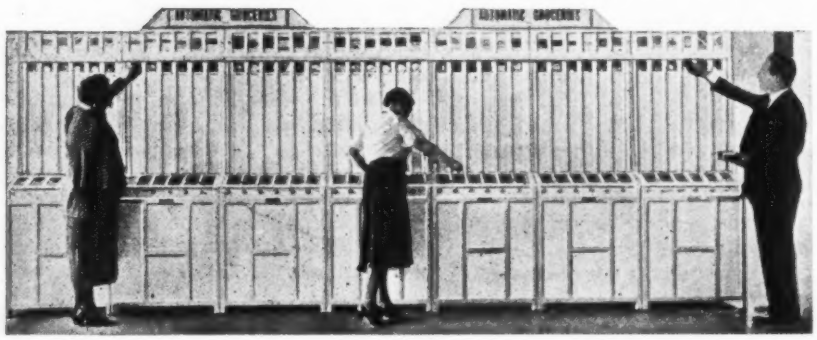
All the hard lozenges are included in group (*b*). The first sub-group contains a great many of the best medicated lozenges and the majority of perfumed cachous. There are other formulæ for these lines, but gum tragacanth alone as a binding agent is by far the most popular. All—or practically all—the cheap machine-made lozenges come into the second sub-group in which gelatine is the subsidiary binding agent, also a few cheap cachous—the majority of these latter, however, are included in a later category. The plain lozenge paste included here is not, of course, a finished article, but provides a base for many lozenges. The same applies to the first item in the next group. As before icing No. 1 is used, except for cheap lozenges and cachous, for which icing No. 3 is quite satisfactory.

The first sub-group of group (*c*) has been dealt with. The second is very similar in its consistency and uses to the plain gum arabic paste. The third sub-group introduces the first of the cream pastes—a different type altogether from those dealt with previously both in uses and texture.

Group (*d*) contains the remaining cream pastes. The cream used is generally composed of equal quantities of sugar and glucose boiled together. Sub-groups (1) and (2) are both varieties of this type of paste and are in regular use, but sub-group (3)—japwork—is not quite the same. The cream is boiled very much higher and the icing sugar is quite subordinate to it and the coconut.

Class VI. Other Confections.

Group (*a*) merely gives an indication of the manufacture of liquorice pieces, etc., and is not meant to be in any way exhaustive. Groups (*b*) and (*c*) are both pan goods. In (*b*) the centre belongs to Class II., while the coating, of course, comes into Class I. In group (*c*) the centre belongs to Class IV. Group (*d*) comprises all satins and pralines. The centres are more often than not of japwork and other paste, but chocolate and a few other confections are also occasionally encountered.



An American Idea for an Automatic Grocery Store in the form of a Super Slot Machine supplying Canned Goods, etc.

The Preservation of Meats in Tin and Glass Containers

By A. SAMSON, A.R.C.S., A.I.C.

The third of a series of articles in which the author discusses in plain language the requirements, both scientific and practical, that are essential to the successful preservation of meats in tin and glass containers, emphasising those particular points which need careful control and observation, and which are apt to be overlooked—especially by those who do not possess a chemist or laboratory. The first part dealt with the correct use of the refrigerator, the equipment of the brine house, the ingredients of the brine, and the practice of brining, while the second part, in last month's issue, described the process of cooking and also cooking vessels, packing tables, containers, gelatine and preparation of jelly stock.

PART III

Lacquers.

IT IS a well-known fact that meats preserved in tin containers, or in glass containers with tin lids, produce a stain on the tin. This stain may be due to sulphide of tin or sulphide of iron, or both. The intensity of the stain depends on many factors. It depends on the condition of the meat at the time it is preserved, on the temperature of preservation, and on the amount of oxygen left in the container.

It is beyond the scope of this article to discuss the causes of sulphur staining, as the manufacturer is much more interested in its prevention. The method of preventing staining is to use lacquer.

There are two types of lacquer used in the food industry; one is an acid-resisting, or anti-acid, variety, which finds special application for jams, fruits, pickles, and strangely enough, potted meat and fish pastes. The other lacquer is a sulphur-resisting variety, and is used for meats and vegetables. These products, during sterilisation, liberate sulphur-containing gases which cause the staining. It is advisable, in those cases of meat products which suffer from staining, that the sulphur-resisting lacquer be used, and this is especially the case for lids for meats in glass. Unfortunately, it is not possible to lacquer the insides of all tins, especially those made by hand, owing to the fact that it is difficult to solder over lacquer without stencilling.

Rubber Rings.

There are now two varieties of rubber rings on the market—viz., the white and the red. At one time there was a prejudice against the red ring because it tended to develop black stains more rapidly than the white. This statement could not be substantiated. The writer has seen many sulphide of iron stains produced by white rings.

At one time red rings contained a large proportion of oxide of iron, and there is no doubt that this compound was a contributory factor to the production of stains; on the other hand, white rings contain no iron oxide. One of the main features of a rubber ring, for meat preservation, is that it should contain practically no free sulphur, and certainly very little sulphur compounds.

Free sulphur to-day can be brought to as low a content as 0·05 per cent. or even lower, and this figure should be demanded.

A rubber ring should also be elastic, resilient, and should possess as little mineral filler as possible in order to prevent hardening and ageing during the course of storage, with the production eventually of cracked rubber rings. Moreover, in the case of cord rings, particular attention should be paid to the joints.

In the application of the rings to the glasses, it is essential to see that the ring is evenly placed right round the groove. Operators have a tendency to stretch the ring on one side, with the result that there is danger during preserving of the cover slipping down on this side and sometimes even allowing the entry of air, with the production of a "non-preserved" glass. One of the best ways to place a cord ring on the glass is as follows: Hold the ring in the middle fingers of both hands, each hand exerting the same pull. Now place one portion of the ring in the groove of the glass, and, still holding the rubber at diametrically opposite points, stretch the ring until you are able to pass the rubber over the opposite side of the glass. Having filled the two opposing portions of the groove with rubber, the fingers are now drawn back, still gripping the rubber, until they are in line with the diameter of the glass. In this position the tension on that portion of the rubber in the groove, on each side of the glass, is the same. The rubber is now released into the groove, and it will be found even all round. Although apparently lengthy in explanation, the operation is surprisingly rapid and simple.

Closing the Tins.

It now remains to consider the preparation of the filled tin container for sterilisation.

The tin having been filled with the meat product may be closed either by a double-seaming machine or else by hand soldering. The latter is the more

dirty process of the two. In placing the lids into position, operators have a bad habit of using dirty hands and tools, rendering the whole operation unsatisfactory.

Employ good solder, and whatever the flux, use as little as possible. In the case of a soldered tin, each should be examined by the tinsmith.

Production of Vacuum.

The tins having been closed, they are now ready for sterilisation. This is a very important stage of the process, and, accordingly, it is proposed to discuss it at length.

A preserved tin always contains a vacuum, and this is produced in several ways. It may be produced by packing the material while hot into the can and sealing immediately, as in the case of soups, or it may be produced by "broguing" or "venting" during sterilisation, or, thirdly, by drawing a "cold vacuum," with the assistance of a machine, prior to sterilisation

It should be remarked here that, of all these methods of producing a vacuum in the tin, the best and most modern method is the last—namely, the cold-drawn vacuum produced by the vacuum machine, except perhaps in those cases where the materials are packed very hot and sealed immediately.

The common method is "broguing" or "venting." In this method, the filled tin, with hole open and liquid oozing out through it, may be partly immersed in a muriate bath, or the tin with the hole open may be sterilised in a retort, which is later closed, or, again, it may be retorted with the hole closed, removed from the retort, the hole opened and the pressure allowed to release itself, and the hole then resealed.

Whichever is the method adopted, there is always loss of material, whether it be fat or jelly. Furthermore, it often becomes very difficult to seal these holes, owing to the interference of jelly, bits of meat, etc. Again, the tins are subjected to strains, which often burst them. These methods also entail extra handling, especially in the retorting.

One source of trouble is that it is rather difficult to control the degree of vacuum produced in the tin. Pasty and chopped goods, such as galantines, are very difficult to "brogue" by this method, and almost always occasion a great deal of time and "language," the latter of such a character as to suggest that the operator was as hot in temper as the tin container was in temperature.

The modern method of treatment is to produce a vacuum in the can prior to its sterilisation. This is done by drawing a vacuum on the tin in a specially constructed machine, with the assistance of a vacuum pump. The advantages of a cold-drawn vacuum are as follows:

1. No material is lost during the process of sterilisation, and thus one can safely use less material in the can.

2. The extraction of oxygen greatly assists in the prevention of discoloration of the surface of the meat, and also of the tinplate itself.

3. The reduced pressure in the cans prevents excessive internal strain during processing. Ordinarily, this strain may be so great as to burst the cans during heat treatment in the retorts.

4. The degree of vacuum can be controlled.

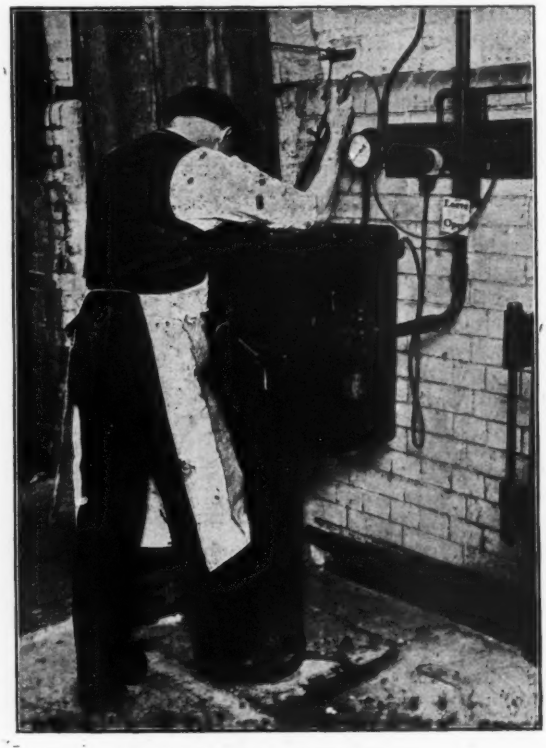
5. Vacuumising first in the cold reduces the time of handling tins during sterilisation, since, by this process, the cans go straight into the retort and are sterilised, whereas in the "broguing" method they enter the retort for a period, the retort is then opened, the cans removed, "brogued," resealed, returned to the retort, and sterilisation completed. This means double handling and waste of steam.

It must be understood that the production of a vacuum in the can prior to sterilisation does not render the time and temperature of a process less important.

Vacuumising Machines.

Vacuum sealing machines are of two types:

(*a*) *The Vacuum Double-Seaming Machine.*—This is a machine in which the two operations of double seaming and vacuumising are done by the same machine, at the same time. As the can rises into the head of the machine it becomes enclosed in an air-tight space on which a vacuum is being drawn. This machine is of great value, but is of little use for hand-made or hand-soldered cans. Futhermore, it is also time-consuming in changing over from one size of can to another. One of its great disadvantages is that the vacuum is applied to the can for so short a period—one to two seconds—that there is



Sealing Tins Under Vacuum.

(Courtesy of John Fraser and Son, Ltd.)

very little chance given for any trapped air to be withdrawn.

This is rather an important point over which the other type of vacuum machine, described below, has a decided advantage.

(*b*) *The Vacuum Tin-Sealing Machine.*—This in its latest form consists essentially of a "box" or small chamber mounted on a stand, and fitted with a window and electric light, so that the whole of the interior can be viewed from outside when the door is closed. Through the top is passed an electrically heated soldering-iron on a ball-and-socket joint, so that the iron has a universal movement. The illustration shows the operation. In this chamber all types, shapes, and sizes (within reason) of cans can be vacuumised to any degree up to 29 inches. Furthermore, the cans may be subjected to the influence of the vacuum as long as may be desired.

There is a little hole in the top of each can, on which is placed a small pellet of solder. This solder is melted by the soldering-iron while the can is under vacuum. The melted solder runs into the hole and seals it.

The writer has seen all types of material vacuumised in this machine, such as tongues, brisket, brawn, hams, gammons, galantines, sausages, and soups.

Vacuumisation prior to sterilisation is also of great value in that it assists in the detection of leaking cans before they are spoilt by sterilisation. The vacuumised cans are "tapped" over before they enter the retorts, and it is thus possible to pick out the leaking or non-vacuumised cans. The sound cans are then passed to the retort, where they are sterilised. This aspect of meat preservation will be dealt with in the next article.

Glass Containers.

We can now consider the treatment of meats in glass. In many concerns, the meats packed hot into glass are pressed, and next morning, when cold, are trimmed and cleaned up, the rubber rings are placed into position and the whole covered by a piece of paper, followed by the tin lid. The lid is kept in position by means of clamps or springs. The glass is now ready for the retort, where it is treated as for tins—*i.e.*, by steam. The glasses may also be processed in tanks of water.

This method of retorting has many faults. One of its greatest disadvantages is that the process is entirely uncontrollable during preservation. The question of retorting will be taken up in more detail in the next article, but it will be as well to consider the disadvantages attendant upon the process just outlined.

In this system, the lid, during sterilisation, acts as a valve. It allows the escape of gas, jelly, and fat, in order that a vacuum may be created after sterilisation. This is where its weakness lies. If there is too much exudation of fat and jelly, a "dry" glass results. On the other hand, insufficient exudation produces a preserved glass with a poor vacuum, thus rendering the lid liable to be easily removed at any time. Often a non-preserved glass is produced; discoloration of the supper surface of the meat results, not only by the air contained in the glass, but also by the dryness of the top portion of the meat during preservation, where there is an insufficiency of liquid.

Exudation of fat and jelly produces dirty lids which, with the iron clamps or springs, make cleaning very difficult, and also tend to remove the external lacquer coating. This process of retorting in glass is entirely uncontrollable and undesirable. Temperatures of preservation cannot be raised for fear of blowing out too much jelly or fat, with the production of a "dry" glass.

Altogether the whole process is not scientific, and there are too many interfering influences involved.

In the next article a more modern scientific and fully controlled method of processing glass will be discussed.

(To be continued.)

A canning line displayed in operation at the Park Works of Messrs. Mather and Platt, Ltd., Manchester. It includes a Slat Type Exhauster, a Seaming Machine, and a Continuous Cooker and Cooler.

Some Preliminary Notes on Poultry Canning

By T. CROSBIE WALSH, F.I.C., F.C.S.

Discussion is invited on the following views.

POULTRY CANNING as a new activity for British canners is very much in the air at the present moment. The object of these notes is not to set out in detail fixed methods of manufacture, but rather to open up discussion upon the problems confronting those whose purpose it is to embark upon the industry.

It would appear, from enquiries made among the West End stores, that the trade in canned poultry and game is practically an export one. Canned poultry is unobtainable in suburban shops. Hence the home trade must be worked up (as was the case with British fruit and vegetables in cans) from practically zero, and prospective canners should realise that for the moment their main outlet would be overseas.

Canned poultry will always constitute a "luxury article" and, as such, its presentation must needs be irreproachable. In this connection, the inspection of some commercial samples of canned whole fowl in glass showed ugly ruptures of the skin covering the breast—a defect not affecting the actual quality of the product but, nevertheless, militating against its immediate acceptance by a prospective purchaser.

Careful preliminary experimentation on the class of bird best suited for canning purposes should be made. The use of different strains or of different aged birds in varying states of condition will place unnecessary obstacles in the way of attaining what should be the main objective of every canner, whatever he may be canning—namely, the standardisation of his product.

American canneries use birds which have finished laying, thus utilising the by-products of the poultry farm.

Canning would best be initiated by the poultry farmers themselves, thus facilitating the avoidance of the difficulties inherent in the purchase of absolutely standard material.

There can be no doubt as to the advisability of the adoption of the very minimum number of sizes of cans to be offered to the public, when treating of the canned whole bird. The importance of packing a fixed net weight is also stressed. This is mentioned in view of the fact that in a catalogue which is before the writer at the moment is seen: "Roast Fowl (Whole) 9s." Incidentally, on enquiry, one was informed that the product, in effect, was not really roast fowl but a boiled fowl placed in a can and "roasted afterwards."

This brings the prospective canner to the consideration of the presentation of his product. In what form, or forms, shall he offer it? Shall he boil it and sterilise it and call it roast fowl? Shall he produce a real roast fowl which may be taken from the can and heated up, if desired, to imitate as nearly as possible the fresh article, or shall he take the line of least resistance and make a mere galantine put into a pea can?

The matter of containers is an important one. It is obvious that, from many points of view, including that of the can manufacturer's, the standardisation of the can in point of shape and size is necessary. It has been suggested that, for a start, canners might put up boned chicken meat, with jelly, in round vegetable cans, but this would savour of a new industry being formed for the purposes of a picnic trade!

However, it is gathered that the matter of cans for containing the whole bird is under serious consideration. There are two possible shapes: (1) an oval can and (2) one conforming more closely to the shape of the trussed bird—*i.e.*, narrow at one end and broad at the other. There is something to be said for both modifications. The last-mentioned type of can would ensure a somewhat closer pack, but due consideration should be given to the matter of space occupied in the cases, especially for the export trade, and also to general handling.

Passing on to the actual manufacturing problems, it is essential to consider the extreme delicacy of the flesh of poultry and the many factors which must influence the nature of the final product.

The state of maturation of the raw bird is important. A comparatively freshly killed bird will react in a different manner to the various canning operations from, for instance, one which has been stored either naturally or by the aid of refrigeration for any length of time. This is an additional argument in favour of the intervention of the actual farmer in the industry.

Pre-cooking should be effected in such a way as to ensure a constant moisture content in the final product.

In the closing of the cans there is a choice of various methods. Vacuum closing is undoubtedly the most satisfactory one. Calcium chloride baths may be used, as they were prior to the introduction of vacuum closing, and, finally, the other somewhat clumsy and labour-consuming device of a preliminary retorting of the cans with open vents, followed by the closing of the vents and the recharging of the cans into the retorts.

In carrying out the sterilisation of his product the canner should aim to steer between the Scylla of micro-organism-infected packs and the Charybdis of over-processing.

In this operation the delicacy and susceptibility of the material he is handling will be brought home to the canner. This is specially mentioned because the tendency of many canners is to make assurance doubly sure by over-processing and thereby to sacrifice the quality of their products. Whatever the product may be—fish, flesh, fowl, or good red herring—its quality is best retained by the employment

(*Continued on page* 369.)

Pressure in Cans

By W. B. ADAM, M.A., A.I.C.,
University of Bristol Research Station, Campden.

The following paper was read at one of the canners' conferences at Manchester in November. It is a simple exposition of the changes in temperature and pressure which take place inside a can during processing. Without some theoretical knowledge of underlying principles it is impossible to understand the reason for certain practical steps which must be adopted in the factory.

THE EXTENT of the pressure set up inside a can during processing is dependent on a number of factors of which the following four are the most important:

1. The pressure of the *water vapour* inside the can.
2. The pressure due to expansion of *air* left in the can.
3. The pressure due to expansion of the *solid and liquid contents*, and
4. Distortion or *doming* of the can.

Of these four, the greatest effect is produced by the water vapour, and, in order to explain how this action is brought about, it is necessary to know one or two facts about the measurement of pressures.

Pressure Measurement.

Pressures may be measured from two different datum lines:

(*a*) From that of the atmosphere—the method generally used in calibrating steam and pressure gauges; and
(*b*) From a zero of pressure which is roughly 14·7 lbs. per square inch below that of the atmosphere.

When using the first system, pressures below that of the atmosphere are regarded as negative pressures or vacua, and it is customary to state these on a barometric scale in inches of mercury, each inch being equivalent to roughly half a pound pressure. The positive pressures are measured in pounds per square inch, but for convenience the pressure is generally referred to as being so many "pounds." It will be convenient for our present purpose to consider the pressure as measured relative to the atmosphere—*i.e.*, the "excess" pressure in the can. The next point to consider is the meaning of the expression "vapour pressure."

Vapour Pressure.

Water at all temperatures gives off vapour and exerts a pressure against that of the atmosphere. At freezing-point this pressure is very low, being only 0·08 lb. per square inch, but as the temperature rises so the vapour pressure increases until at boiling-point it reaches a value of 14·7 lbs. per square inch, which is the same as the pressure of the atmosphere. The boiling-point is, in fact, the point at which the vapour pressure just succeeds in overcoming the atmospheric pressure. If the atmospheric pressure is reduced either by using artificial methods of evacuation, or by ascending to higher levels, such as, for example, the top of a high mountain, water boils at a lower vapour pressure, and hence at a lower temperature.

Now let us consider what happens inside a can, and for the moment we can ignore all other factors but vapour pressure. The can is closed at a temperature of, say, 130° F. and cooled to a room temperature of 60° F. A vacuum gauge inserted into the can will show a vacuum which is equal to the difference in vapour pressure of water at 130° F. and water at the temperature to which the can has been cooled. The vapour pressure of water at 130° F. is 2·2 lbs. and at 60° F. it is 0·25 lb.; the difference is 1·95 lbs., or the equivalent of a vacuum of 4·0 inches of mercury.

Supposing the can is now heated; when the temperature has reached 130° F. there will be neither pressure nor vacuum in the can, as this is the condition under which it was closed. If the temperature is raised to 212° F. the positive pressure inside the can will be the difference between the vapour pressures at 212° F. and 130° F.—namely, 14·7 − 2·2 lbs.; that is to say, 12·5 lbs. If raised still further to 240° F., the pressure inside the can will be 25·0 − 2·2 lbs.; that is to say, 22·8 lbs.

As the internal pressure in the can is the difference between the vapour pressure at processing and closing temperatures, it is seen that the *higher the temperature at which the can is closed the less will be the pressure inside the can when heated.* Thus cans processed at 240° F. which have been closed at 130° F. and 180° F. will show internal pressures of 25·0 − 2·2 lbs. and 25·0 − 7·5 lbs., or 22·8 lbs. and 17·5 lbs. respectively.

At this stage it is worth while considering what pressures of this magnitude actually signify. No. 2 cans generally distort and buckle along the seams at a pressure somewhere between 25 and 30 lbs., and No. 2½ cans may become permanently strained at still lower pressures.

This does not leave much margin of safety if the full pressures previously mentioned are exerted without any counteracting forces. In practice, however, there is a pressure on the cans during processing which is equal to the pressure of steam in the retort, and this is partially counterbalancing the internal forces in the can.

Now if we suppose that the steam pressure is blown off very rapidly at the end of the processing time, what will occur? The temperature inside the can

only drops very slowly, and by the time the retort is back at atmospheric pressure the pressure inside the can has hardly dropped below the maximum value it attained during processing. There is this difference, however, that there is now no counteracting force pressing on the can from outside, and the full internal pressure is effective in doming and distorting the can. In the case of No. 2½ cans permanent buckling or stretching of the seams may take place.

How may this buckling be avoided? If it is possible to retain an external pressure on the cans and at the same time allow them to cool rapidly in water, the desired result may be obtained. As soon as the cans have cooled sufficiently to reduce the internal pressure to a value below the danger-point, the artificial external pressure may be released, the retort opened, and the cans removed and the cooling completed in the ordinary way.

Expansion of Air.

If we consider the pressure conditions immediately above water at various temperatures we find that the full atmospheric pressure of, say, 14·7 lbs. is now divided into so many pounds' pressure due to water vapour and the remainder due to air.

At 130° F., 2·2 lbs. is water vapour and the remaining 12·5 lbs. air.

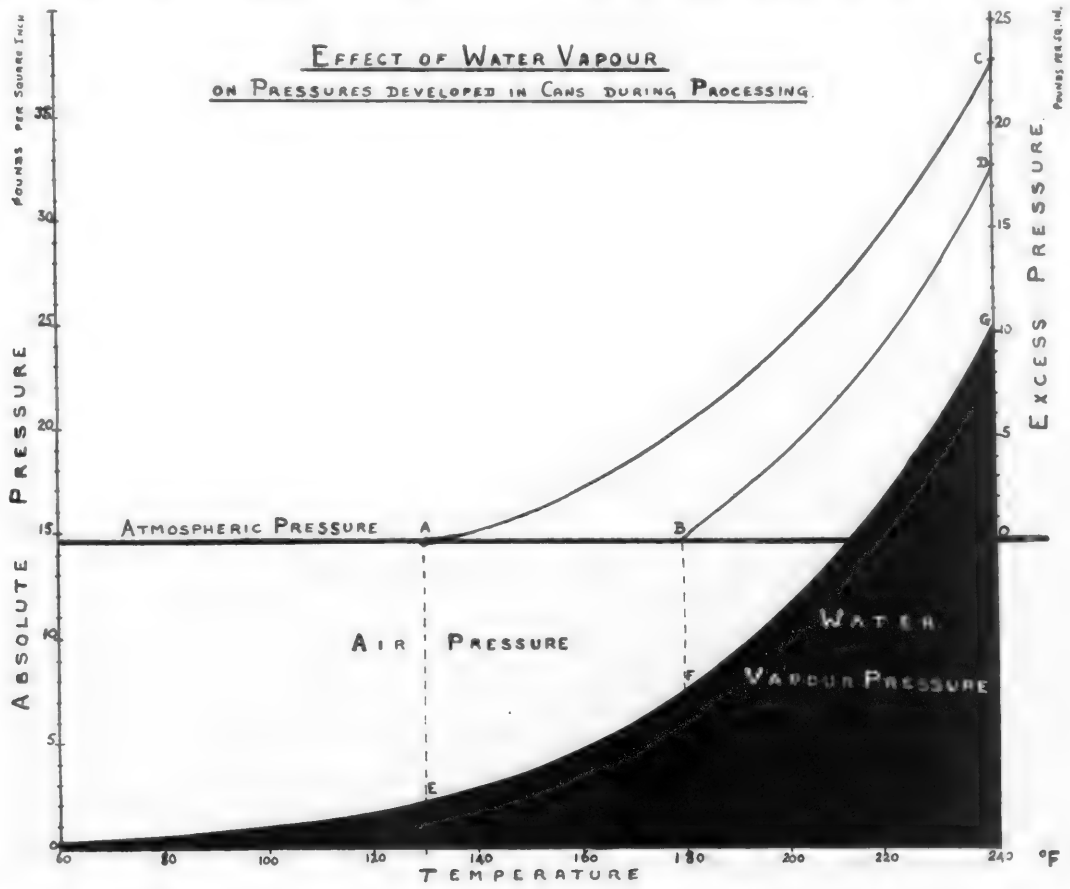
At 180° F., 7·5 lbs. is water vapour and the remaining 7·2 lbs. air.

At 212° F., the whole 14·7 lbs. is water vapour.

So it will be seen that at 130° F. roughly 15 per cent. of the atmosphere is water vapour, at 180° F. about 51 per cent., and at boiling-point the atmosphere consists entirely of steam.

These figures show that a definite proportion of air is trapped in the head-space when the can is closed. The effect of heating this air from, say, 130° F. to 240° F. is not very marked, as the increase in pressure from this source would only be about 2·7 lbs.

The two other factors involved are the expansion of the solid and liquid contents, and doming of the can; these two may be grouped together under the heading "Alteration of Head-space."



Alteration of Head-space.

Water expands when heated and, when raised from 130° F. to 240° F., the increase in volume is about 4·1 per cent. This is equivalent to approximately one-fifth of an inch rise in level, in a No. 2 can. The effect of this expansion of the can contents is to compress the air and water vapour in the head-space. The forcible compression of the air sets up a pressure directly proportional to the contraction in volume—

thus a contraction to half the volume will double the pressure. The effect of the pressure on the water vapour is negligible.

Very high internal pressures would be recorded unless the cans were expansible, but the fact that the volume of the can may increase due to doming relieves much of the pressure which would otherwise distort the can.

The calculation of the exact pressure inside cans under various conditions is extremely complicated, as we are not dealing with water vapour in contact with *pure* water; we have substances present which may give off gases when heated; we do not know accurately the extent to which the various substances will expand when heated; and, while we can determine the expansibility of the can, we do not know how soluble the gases under pressure in the head-space will be in the liquid contents of the can. Despite all these difficulties, however, we can obtain a fairly good practical idea of the pressures occurring in cans during processing, and there are two points which should be kept in mind:

First, that, as the pressure inside the can is roughly the difference between the vapour pressures at processing and closing temperatures, *the higher the closing temperature the less internal pressure there will be in the can;* and, second, that the pressure inside No. 2½ cans at 240° F. is near or beyond the danger-point for buckling *if the compensating external pressure in the retort is released too suddenly*, and to prevent this, pressure cooling is advisable. The smaller size cans will stand much greater pressure, but to be on the safe side they should be closed at a temperature of not less than 160° F.

In practice it has been found that cans of most vegetables in brine processed at 240° F. show a maximum excess pressure above that of the atmosphere of 20 to 21 lbs. if closed at 160° F. and 18 to 19 lbs. if closed at 180° F. These are very close to the theoretical values for vapour pressure alone.

The Pressure Diagram.

The diagram given here illustrates graphically the main points set out above.

The cans are closed at atmospheric pressure, this being composed partially of air pressure and partially of water vapour pressure, in the proportions of white and black shown below the atmospheric line, for any temperature.

If a can is sealed at a temperature of 130° F. (the point marked A) and the temperature is raised, the increase in vapour pressure inside the can will cause the internal pressure to rise along the line AC, following the vapour pressure curve but at a constant height AE above it. The rise in pressure from A to C is, therefore, the same as the rise in pressure from E to G, or, in other words, is equal to the difference in the vapour pressures at closing and processing temperatures read on the absolute pressure scale marked on the left.

Thus the absolute pressure at E is 2·2 lbs. and at G is 25·0 lbs., the difference being 22·8 lbs. This is the height which C has risen above A—*i.e.*, is the "excess" pressure in the can above atmospheric pressure.

Similarly, BD represents the rise in pressure for a can closed at 180° F., this being equal to the increase in vapour pressure between F and G—*i.e.*, 25·0−7·5, or 17·5 lbs.

This diagram only shows the effect of vapour pressure; it ignores the alteration in the air pressure AE or BF. This alteration is due to expansion of air, with rise in temperature and alteration in volume due to the counteracting effect of the expansion of the can and its contents. For high-closing temperatures the effect is small, and in any circumstance it is dependent on the volume of the head-space. The air pressure factor must be determined experimentally, but in most cases of vegetables in brine the final combined effect of pressure from all sources is not very far removed from the theoretical figures given for water vapour.

Colloids and Food Manufacture

IN whatever direction he may turn in the course of his technical work, the food chemist sooner or later comes up against some aspect of a problem which, for its proper understanding and ultimate solution, demands a knowledge, or at least a source of knowledge, of modern colloid chemistry. This department of physico-chemistry is just as much a basic science of food technology as are bacteriology and organic chemistry. Yet, in spite of its fundamental importance, no attempt has been made to provide a comprehensive survey of the voluminous literature widely scattered through journals and bulletins until only the other day, when a book by Dr. William Clayton on the *Colloid Aspects of Food Chemistry and Technology* was published.

We hold, with positive conviction, that the appearance of this book cannot fail to stimulate a new phase of activity and progress in food technology. Why? Because it will raise the general level of the food chemist's mental equipment, bring home to him the intimate relations which exist between colloid chemistry and many questions which arise in practice, and save him much time and trouble in searching through literature for data and references. In these respects, among others, Dr. Clayton has rendered service of inestimable value to the technology of foodstuffs and also other materials, since the book embraces a wide field of application of colloid science to industrial activities.

Thus, after a general statement of the history and scope of colloid chemistry, the author takes up in turn agar-agar, gums, proteins, gelatin, cereal chemistry, emulsions, milk and milk products, nutritional chemistry, sugar technology, fruit jellies, jams and marmalades, brewing, freezing and thawing, and the treatment of water and factory effluents, and discusses each in the light of the science of colloids. There is, for example, much valuable information given concerning salad dressings and mayonnaise, on honey, pectin, margarine, butter, caramel, casein flocs, ice-cream, the staling of bread, and innumerable other subjects of interest to the manufacturer.

Of especial value is a comprehensive bibliography of over 2,000 references. The matter throughout the book is well arranged, and the printing, paper, binding, and general presentation of the book are admirable. ("*Colloid Aspects of Food Chemistry and Technology*," *by William Clayton, D.Sc., F.I.C., Chief Chemist and Bacteriologist to Messrs. Crosse and Blackwell, Ltd. (London). Pp. 571. Illustrations, 64. J. and A. Churchill, London, 1932. 36s.*)

British Canners' Appreciation

THIS ILLUMINATED ADDRESS TOGETHER WITH A CHEQUE WAS PRESENTED IN NOVEMBER 1931 AS THE IMPERIAL FRUIT SHOW & CANNING EXHIBITION HELD IN MANCHESTER TO

F. HIRST ESQ. M.Sc. A.R.C.S.C.

DIRECTOR OF THE CAMPDEN RESEARCH ASSOCIATION

In recognition of his valuable services to the Canning Industry. The signatories desire to place on record their warm appreciation of the advice and assistance ever readily given by Mr Hirst; his keen interest in the varied problems affecting Canning; and his unfailing courtesy.

They wish him a long & successful association with the Industry.

Messrs Arthur Holden & Sons Ltd.
Messrs Co-operative Wholesale Society Ltd.
Sir Edgar Jones.
Messrs F.J. Ballard & Coy Ltd.
Messrs Yearley & Tonge Ltd.
Messrs Batchelor & Coy Ltd.
Messrs Lamb Bros (Dublin) Ltd.
Messrs Barrows Fruit Ltd.
Messrs Lincolnshire Canners Ltd.
Messrs J. & J. Beckett Ltd.
Messrs Mather & Platt Ltd.
Messrs Chivers & Sons Ltd.
Messrs Moorhouse & Sons Ltd.
H. Leighton Davies Esq.
Messrs Needlers Ltd.
Dr H. Owen-Lane.
Harry Phipps Esq.
Messrs English Preserved Foods Ltd.
Messrs J. A. Sharwood & Coy Ltd.
Messrs Joseph Farrow & Coy Ltd.
H. Spencer Thornton Esq.
Messrs J. Foster Ltd.
Messrs Sidcup Preserving Co Ltd
Messrs Foster Clark Ltd.
Messrs Sutton Ltd.
Messrs J. A. France & Coy Ltd.
Messrs G. H. Williamson & Sons Ltd.
Messrs Hampshire Preserving Coy.
Messrs Watson & Coy Ltd.
Messrs Wm. P. Hartley (London & Aintree) Ltd.
Messrs Yorkshire Canning Coy Ltd
Messrs Herefordshire Fruit Coy Ltd.

WE reproduce a photograph of the illuminated address presented at Manchester by members of the Campden Research Association on November 3 to Mr. F. Hirst, Director of the Campden Research Station. Accompanying this was a cheque (which we have not had an opportunity of photographing) and, to Mr. W. B. Adam, a gold wristlet watch. The organisation of the fund has been in the hands of Mr. R. J. Cox and Mr. A. Ll. Matthison.

In making the presentation, Mr. A. Woodall, of the Vale of Evesham Fruit Canners, Ltd., paid a glowing tribute to the valuable services rendered to the canning industry by Mr. Hirst and his staff. This was supported in a short address made by Captain W. Brumwell. In his reply, Mr. Hirst recalled the uphill struggles during the early part of his office, now in its ninth year, and stated that they had always tried to help those who brought their difficulties to the research station. Any success they had achieved had been largely due to enthusiasm and perseverance. He felt certain that there was a future for canning, but it must be built and carried on along scientific lines.

It gives us great pleasure to have this opportunity of expressing the very high admiration which we have for the splendid work carried out by Mr. Hirst and Mr. Adam at Campden.

November 20, 1931.

The Editor, FOOD MANUFACTURE.

DEAR SIR,

I hope you will permit me, through the medium of your journal, to thank all the canners and members of the allied trades who contributed towards the handsome present made to me at Manchester.

Wherever I may be in the future, the illuminated address will remind me of the men I met in connection with my work at Campden, many of whom I am proud to call my friends. It is very gratifying to note that the names of the firms appearing on the address include, not only many of those who have entered the industry during recent years, but also those of three or four of the pioneers who were canning before the developments of the last few years occurred.

Whatever services I have been able to render the industry have been given willingly, yet at the same time it is very pleasant to feel that my work has been appreciated.

I would also like to take this opportunity of acknowledging the excellent work of my assistant, Mr. W. B. Adam, and it gives me much pleasure to know that it is recognised by the industry.

I sincerely hope that the work of the Research Station in the future may be still more worthy of the interest and support which it has received in the past from all those connected with the canning industry.

Yours faithfully,

F. HIRST.

FRUIT AND VEGETABLE PRESERVATION
RESEARCH STATION,
CAMPDEN, GLOS.

November 20, 1931.

The Editor, FOOD MANUFACTURE.

DEAR SIR,

May I crave the privilege of a short space in your columns to thank all those members of the canning and allied industries who were concerned in the presentation of the very beautiful gold wrist-watch which was made to me at the recent Canning Convention?

I particularly appreciate the fact that the organisers of the presentation to Mr. Hirst saw fit, in this manner, to associate my name with his. The wrist-watch will always remain as a reminder of many pleasant hours spent in endeavouring to unravel some of the practical problems of the industry, and of new friendships formed in this work, but I shall value it still more as an indication that our efforts of the past few years at Campden have been appreciated by the industry.

Yours faithfully,

W. B. ADAM.

FRUIT AND VEGETABLE PRESERVATION
RESEARCH STATION,
CAMPDEN, GLOS.

Proceedings of the Canners' Convention

Manchester, November, 1931

Overcoming Pressure Troubles in Cans

By MR. LOCKE

This paper followed that of W. B. Adam, published on page 355 of the present issue.

MR. ADAM has given you a lot of figures and scientific detail of pressures in cans, and I want to try and show you the way to overcome all this trouble, and it is quite simple. We want to prevent the distortion of the cans themselves, and mainly the distortion of seams, and I want to show you how the quality of canned content can be improved by pressure cooling. We know that a can which is processed at a high temperature becomes strained at the end seam, although this straining does not extend to the making of a hole in the can and the making of a leak that anything is going to blow out of.

You will find, if you close a can, at somewhere about 160° F., you should have a vacuum in the can when it is being cooled down; but in this case, as it is being cooled down, it is going to draw air through the seam as it is being distorted, and you will find no vacuum, and you will wonder why, because your seam is apparently tight, and you may get blown cans later on. A 2½-sized can when it is processed at 240° F. and cooled suddenly will buckle, and it will never go back. On a smaller can we do not get that buckling, on an A1 or A2, but we do get a tremendous strain on the seam, and you will find on examination that the metal on the lid and the countersink has been drawn away. As the end expands it comes up and must draw metal from somewhere, and it draws it from the countersinks, from the body of the can, and it has just the same effect as putting pliers on the outside and drawing the seam away from the body on the outside. It is the same effect, in other words, as using a chuck which is too small in diameter. To roll, you must roll against the chuck, and you must have a solid foundation. If you use a smaller chuck you never get a tight seam; it is the same effect as pulling the metal on the countersink from the body of the can.

I measured a seam recently for thickness in width before the retort process and found it to be 60/1000 of an inch. After the process I again measured for thickness and found it 65/1000, which meant that the seam had opened up 5/1000 on the countersink of the end, due to the internal strain. Any of you can make a practical test of this by taking a can of peas after a 30 or 40 minute cook; immediately you open your retort, take a can from the retort as you open the door and use a compound vacuum gauge, the same principle as for testing a vacuum. I advise when doing this you should wrap a piece of rag around the rubber or you are liable to get scalded by the hot liquid blowing out. When you bring the can out insert the pressure gauge, and you will find there a pressure on a 2½-size can sufficient to buckle it; you will find there somewhere about the figure Mr. Adam has given you, and you may see, without a whole lot of equipment and experiment, that the pressure will be enough to buckle a 2½-size can. If you look closely at that can and use a gauge to measure the can after being processed, and compare it with an empty can, you will find the ring on the panel at the end has come up 1/16 of an inch, and you can judge for yourself just what that has done for the seam.

Mr. Adam has given you the figures, but I will tell you, in a few words, how we are able to get over it. It sounds a big thing, but it is really a simple proposition to overcome. I am not speaking now of continuous pressure cookers, because we have not a continuous pressure cooker working, and so we have not had much time to find out. We have tried a lot of methods of pressure cooling, and we find air pressure by far the simplest and most effective of any. You take a compressor capable of producing 20 cubic feet of air per minute at 80 to 100 lbs. pressure, and a receiver which will hold sufficient air at this pressure to fill one retort at 20 lbs. per square inch—a standard vertical or a horizontal retort. The operation of air pressure cooling is very simple. At the moment the cook is completed the air is turned on, and the pressure in the retort, which is now 10 lbs., is increased to 2 lbs. above the difference in the retort pressure and the internal can pressure. For example, suppose the pressure in the can is 23 lbs., retort pressure is 10 lbs., therefore the excess pressure is 13 lbs., and we arrive at 13 lbs. plus 2 lbs., making 15 lbs. air pressure required while cooling.

The retort having reached 15 lbs., or whatever may be required according to temperature used, the steam valve is closed and water admitted by means of a perforated pipe situated along or around the top of the retort, as the case may be. As the water fills the retort the excess air must be released by an outlet valve situated on the top of the retort, although the relief valve will automatically take care of this if set for the given pressure. The air pressure may also be automatically controlled by the installation of a reducing valve between the air receiver and the retort. When the retort has filled with water the temperature of the cans will still be above the safety degree of temperature for storing, therefore the water is allowed to leave by the top outlet until the desired temperature is reached, the pressure still being controlled by the outlet flow or relief valve. The retort is then drained and the cans are ready for the warehouse without any further handling for cooling, and you can rest assured that these cans will be exactly the same in all measurements as they were when they entered the retort.

It is the usual practice to carry the used water over a cooler and then pump to a storage tank for further use on cooling, and you will find by this method that you require no more—if not less—water than the amount required for open bath cooling. Now I would like to say just a few words about the product. An A1 or A2 size can does not dome in the retort while the cook is going on, unless a very high temperature is reached; therefore, when the steam is turned off, the ends of the can spring out suddenly. This must cause a pull on the product inside the can, and I contend that a number of split peas come from this, especially on soaked peas. I will give you an instance of this; although it was not peas, it was, nevertheless, food inside a skin.

A meat packer, who had been in the business for a number of years, could make and fill into cans a very fine quality of sausage nicely sealed up in the skins. After the cook in a retort the sausages were still in the cans and lying in the same position, but they were undressed and the skins were usually at the ends of the can. After some tests we advised pressure cooling, and I can assure you that every can of sausages that now enters the retort comes out after the cook as sausage and not meat and loose skins.

If any canner is interested and wants to discuss these questions further, my company, the Metal Box Co., will go into all details with him, and any advice which is given by that company is founded on actual practice; it is not on slight experiment. From pressure cooling we gain four things. First, we have got the cans relieved of all strain; in the second place we have got labour saved in handling because your cans coming from the retort are cooled sufficiently for storage; you take them out from the retort and you have not to handle through a bath. In the third place you have quick cooling; the quicker you are able to cool the can, the quicker you get it off the cook the better; there is no softening effect and you get a better appearance. A can

of vegetables which is cooled down very slowly is inclined to turn a little in colour and to be soft, whereas it should be nice and crisp. Then, in the fourth place, we have the risk of weeping seams reduced to a minimum.

DISCUSSION

MR. SAMPSON: In the first place, I should like to express my real appreciation of the two papers we have just had. The one by Mr. Adam deals with a very difficult subject in very simple language which can be thoroughly understood by everyone. Mr. Locke's paper deals with a subject which is of far greater importance than the average canner in this country realises—*i.e.*, a proper cooling system.

I should like to raise one point with regard to Mr. Hirst's admirable paper (published in the November issue of FOOD MANUFACTURE). He mentions, especially in connection with soft fruits, the misshapen types of fruits that he is experiencing. I would like to know from canners later on if there is any effect noticeable from the modern automatic system of cooking. In the old-fashioned process where cans were filled, double seamed, and then put into tanks, the soft fruits remained stationary, but in the modern system of automatic cooling, especially with fruits like strawberries and loganberries, it has been the experience of canners that there is a tendency to soften those fruits which are already soft more than should be the case. With the high temperature and the agitation, I feel that there must be some contributory factor from the agitating cookers giving an undesirable effect. I am not trying to decry the automatic machines, but I would like to know what is the experience of canners who have used the old stationary bath process and the modern automatic cooker.

Coming to the pressure cooling system, I am pleased to say that I have used pressure cooling with water, whether it is glass or whether it is tinware, for six or seven years. I have stressed, during that time, the value of pressure cooling. (See FOOD MANUFACTURE, August, 1930.) But, in regard to the statements that Mr. Locke has put forward, I feel that I must disagree in certain respects. I am not at all fond of cooling by spray at the top in steam retorts. A retort is full of steam. You have your air pressure going into the retort, giving you 15 lbs. per square inch. The moment you turn on, especially a 3-inch valve, you will immediately flood the steam space with cold water. You condense that steam immediately. If you are not careful you will be doing just that thing you do not want to do. Instead of having a pressure in the retort, unless you have an enormous area, you will cause condensation to such an extent that you might even create a vacuum in the retort. These are actual facts. In small retorts that are only half filled there is a large volume of steam space with water coming in, especially if it is cold, and this will reduce the pressure to a considerable extent. You will get that immediate rush of air to replace the steam that has been reduced. Therefore, I favour very much the introduction of the water from the bottom. The introduction of the water assists the can maker as well.

Another reason why I do not like water from the top is this: All these cans are domed. There is a head-space in the can. The moment the cold water falls on the top of the can there is a tendency for the dome of the can to be in the reverse direction; instead of being outward it might be inward. I think there is equally a strain, when the dome pulls inward, of pulling the seam parts as well. With the introduction of the water from the bottom the cold water meets the bulk of the material in the can, and, as it rises, it gets hotter and hotter. So all these steam spaces in the can are met by moderately hot water.

If you introduce a 2-inch or 3-inch main, that hot water is replaced quickly by cooler water. So you do not get the difference between water at 45° F. to 50° F., but you get the water coming gradually down from 200° F. to 112° F., and so on. Furthermore, in the introduction of the water from the top, unless you have your air draining in through the bottom, and violently agitating the water that comes in from the top with the body of the water in the retort, you will not get your efficient cooling; but if you are replacing the water which goes out at the top by cold water getting in, my experience is you get far more efficient cooling and far quicker cooling with a great deal less anxiety, especially in regard to men handling the air valves.

Another point which should be stressed is this. I think that Mr. Locke has forgotten it or he would have mentioned it. The air pressure should not be continued for too long a period, because, instead of having an internal strain in the can outwards, if cans are cooled to that point where there is no internal pressure, or the pressure is so low if your air pressure is still maintained, you will have an external pressure inwards. In other words, with a pressure in your can of 22 to 23 lbs., and, when you started cooling, a pressure in your retort of 15 lbs., that means you have a pressure in the can exerting itself of 8 lbs. If the pressure is reduced so that there is no pressure internally, but you still maintain your pressure in your retort, you will still be tending to depress your can inwards. If the temperature of the cooling water drops, or the pressure in the retort should drop—that is to say, if you start off with an internal pressure in your retort of 15 lbs., and the pressures on the internal side of your can drop—by the time the water coming out of the retort is fairly cold there is no need to have any pressure in the retort whatsoever. The door, or the lid, of the retort can be opened, and you can flood your retort, and cool your cans as quickly as possible. There is that danger if one is over-anxious to have pressure on the cooling system. Finally, I would like to say that there is a firm in this country which is installing, and has installed for quite a considerable time, water pressure retorts and water pressure systems complete, whether vertical or horizontal.

MR. LOCKE: In regard to the matter of cooling the product in the retort from the top to the bottom, if you have a vertical retort, and you start to cool from the bottom, and if you allow six minutes for the water to come to the top, it means that your top end has six minutes more cooking power. I think you will find, if you have sufficient pressure on your retort before you start your water going in, you have already put a strain on the dome of the can. With cold water coming to the top there would be a condensation of the steam. I did forget to mention the point. If the retort is filling up, and the cans are cooling, then if you have too high a pressure on the outside there will be a collapse because there will be a vacuum on the inside of the cans.

MR. SAMPSON: I do not suggest a water main of less than 2½, otherwise it will not be any good. Mr. Locke has just said it would take six minutes to fill the retort. It depends upon the size of the water main and the pressure in the water main. We must realise that, in the case of a vertical retort, the cans that are nearest the steam injection line always receive more heat treatment at first. Therefore, I suggest very strongly they should receive the cold water before the top cans. Furthermore, if you have the sizes of water main and pressures I have mentioned you can fill the retort within two or three minutes.

Stabilising Fruit Supplies

By H. V. TAYLOR

Ministry of Agriculture and Fisheries.

I HAVE been one of those who have watched with great interest, and, I might say, satisfaction, the canning factories being built and increased throughout this country. I have watched, with great interest, the home products being canned and supplied to the public, who could then eat the home grown fruit in canned form instead of having to import it as they were doing in the past. But I want you to realise this: Canning factories, as regards the question of supplies, could never have been started at a more opportune moment. I find, however, that there is not quite the same ease in getting supplies as there was in the past. Canners

write me, and they say that they are not getting quite as many strawberries as they want, that the supplies of loganberries are far short of what they can deal with, and that, as for asparagus, they have not started to can this product to any extent because supplies are not available.

Is not security of supplies one of the important things to an industry of your kind if you are to secure stability? I take it that what you want is to be able to get definite and certain quantities of supplies steadily every year in order that you can turn out a definite quantity of canned products at more or less a level price and without any very big fluctuations.

If the canning industry is going to stabilise the position which it has now gained, and is going to prepare the ground for future development, then it will have to pay attention to the question of supplies and secure its future in that way. Therefore, I thought I would look round the various other countries and see how they manage to deal with the situation there. I think that if you study the canning countries like California, or other parts of America where canning is done, or Canada, or, for the matter of that, Italy and Switzerland, you will find that the whole question is dealt with, or mainly dealt with, by the system of growing on contract. The growers who set out to cater for the canning industry entered into an arrangement with the factories to supply the right kind of fruit for their purposes. They are not concerned materially with growing for the fresh fruit market. There have been established in those countries growers who are concerned with growing for the fresh fruit market, and also growers who are concerned with growing for the canning factories. What I am anxious to see done in this country, both in the interests of the growers and the canners, is something of the same kind. We are quite ready to play our part in calling conferences and meetings in order to ascertain whether it is possible, even for things like asparagus or loganberries, to arrive at a basis of contract, or a mutual understanding between the factories and the growers, so that these supplies can be secured, not for one year, but definitely for quite a long period of time and make the whole thing secure.

I would make one other suggestion, because, again, on that point, I want your advice. The canners have been looking at the National Mark and grade of the National Mark. You know exactly what it can do for you when you put it on to a can for selling purposes. Is it not possible for us to fix a National Mark grade for growers' produce for the canning factories? If you can have a grade which the grower can use with asparagus, or gooseberries or plums or something like that which is called a canners' grade of fruit, then it seems to me possible that you could fix up contracts for the delivery of a grade which is especially suitable for canning factories and that we shall be able to have stability of supplies. With those few words I want to throw out, first of all, a question, and then, secondly, a suggestion, in the hope that I shall stimulate you either at this moment, or preferably the Council at other moments, to give replies to the question and the suggestion I have put to you.

DISCUSSION

A SPEAKER: I would like to say how much we, as canners, welcome the remarks of Mr. Taylor. I have realised to-day, with the growth of the canning industry, that we are probably heading for shortage, particularly for first varieties of fruit and vegetables. I feel it would be an effort in the right direction to call the growers together, so that we could formulate some scheme whereby they would be prepared to grow the fruit and vegetables which the canners require. In return, I feel confident that canners would suggest prices that would be appreciated by the growers and which would develop the growing end considerably more than is the case to-day.

A SPEAKER: I think it will be within the knowledge of Mr. Taylor that in our area, in Hertfordshire, we had a conference. There was an excellent meeting with all the growers of the area, but the snag was, What were they going to do in Wisbech? We were prepared to look three years ahead. It is necessary to give a three years' contract for the planting of strawberries, and the growers were willing to consider greatly increased planting areas if we could state a bottom price. They said: "We do not want your maximum price, but give us your bottom price over the three years. We shall then feel we have some security to go ahead." That was a perfectly straightforward thing to say to us. Then there was the question of what was going to happen in Wisbech, or other areas, in the next two or three years. Also, what was to happen with regard to the general situation which will perhaps be altered to some extent by what has happened politically. The suggestion I would make to Mr. Taylor, following along the line of the suggestion he has thrown out, is that there should be area conferences, but they must be brought up into a national conference with the Minister of Agriculture and the National Council, so that there shall be some national figure. Otherwise the thing will break down if it has to be done in localities. There must be a locality effort, but it must be brought up into a national effort and a national price.

THE CHAIRMAN (SIR EDGAR JONES): I may explain that the Growers' Committee of the Council did not meet last year because we had gathered that the canners were for the time being going along with their individual arrangements. But, of course, in view of what has been expressed here to-day, it is quite obvious we will, at an early date, call the Growers' Committee together and put the problem to them. Then, after a preliminary consideration of the matter, we can have a joint meeting of the Growers' Committee and the canners to try to work out some kind of systematic plan either for local conferences or whatever may be the best procedure, so that we can get the business immediately if there is a change of situation.

A SPEAKER: There is one point I left out. We all felt the snag of the Government saying: "We will help you to plant Victoria plum trees, but we will not help you to plant strawberries." The growers, through the Farmers' Union, are prepared to find substantial supplies of fruit, and to come into the scheme, as well as deal with plum trees.

COLONEL MITCHELL (Messrs. Angus Watson): I am speaking for the moment as a distributor and not as a canner. I would like to emphasise the point of quality which Mr. Hirst brought up so very ably in his excellent paper. Having had the opportunity of examining various fruits of representative firms this season, we have been impressed by the need for greater care in grading and in canning; particularly in the grading of gooseberries and the packing of strawberries. The discrepancy in the size of gooseberries has been very marked, and in the case of representative brands of strawberries we have found the fruit has not been properly packed. If the industry is to seize the opportunity, which you have said is the opportunity of a lifetime, in the near future that kind of thing is not good enough. The industry must be built up on quality.

Promotion of Sales of Home-grown Canned Produce to Public Institutions and Authorities

THE CHAIRMAN (SIR EDGAR JONES): The next point on the programme is the promotion of sales of home grown canned goods to institutions and public authorities. We found, a few years ago, that there existed a most remarkable state of things with regard to our Government Departments and our municipal and public institutions. The first extraordinary thing we found with regard to the Government Departments was that their forms of tender were so drawn up that no English canner could even quote at all to sell any English products to a Government Department. Well, that has been dealt with. It took a good deal of time to open up the field so that the packer of English produce should have at least the opportunity of sending in a quotation to the great Government Departments.

Mr. Hodges, of the Empire Marketing Board, has been engaged during the past two years or more in patiently going round, on behalf of the Board, and meeting committees of the public authorities and quietly converting them to the view that they should at least arrange, in their forms of tender and contract, opportunities for British producers to have a share of this huge business.

I would say this, finally and definitely, that if there is a market in the world that we have a right to claim, that we have a preferential right of claim over, surely it is a market that we have to provide out of the public rates and the public revenues.

MR. HODGES: First of all, I should like to express my warm appreciation of the opportunity that has been afforded to me to give you some idea of what the Empire Marketing Board is doing for the commerce of this country. As you know, commerce is the keynote of all finance. It is the keynote of all development, whether of Empire, country, or, gentlemen, of your business.

I have been able to deal with many problems that have arisen with regard to committees dealing with the question of altering tender forms to include the home produce. The point raises a very important question indeed. We have heard a very great deal of the technical side of canning, but this question raises a more important point, in my mind—the question of salesmanship. In my view, in this country—and I have had a big experience, as I have stated—we are behindhand in the question of salesmanship. It is from that point of view I want you to take the matter into consideration. Whatever scientific research work you undertake is of no use whatever unless you can apply it to the commercial commodity. The application of scientific research to the commercial commodity is the great thing that matters, because, whatever you do, you must encourage and develop your commercial activities.

This consideration involves a great many points, and among them is education. This all tends to show what the Empire Marketing Board is doing with regard to getting these public authorities to adopt their suggestion of using home produce. That is the first plank in their propaganda, and it is one of the most important ones.

Reference has been made to the question of grading. I want to emphasise very much more than has been emphasised to-day the importance not only of grading for size and appearance but also for quality and the appearance of the tin. People buy more by the eye than by the taste. Their first impressions and their desire to purchase are encouraged by the eye, or the appearance of the thing. That is one of the things I would like to emphasise to you. In California they have established grading, standardisation, and specification. A man in this country can purchase their goods just as well without seeing them as he can by seeing them. The reason is that the specifications are absolutely adhered to. In the case of any goods that do not come up to the specifications, arbitration is resorted to immediately on arrival in this country.

We have, in this country, a wonderful opportunity to build up a business. But, do not get into the habit of saying: "I have canned so many cans of fruit this year." Give the public quality. Let English fruit stand for quality.

If you are going to build up a business, then you have the Empire Marketing Board at your back, with all their opportunities and all their powers of advertising. I want you to back up that power by the quality of your commodities, and then success will attend your efforts. The quality of English fruit cannot be beaten in either taste, flavour, or appearance.

Another thing I want to impress upon you is the value of advertising. I saw a wonderful advertisement the other day, issued by one of your well-known canners. Perhaps all of you have seen it. I think it is a striking illustration of one of the methods of bringing your business to the attention of the public authorities. You have got your travellers to call upon them. You have got your travellers from the wholesale houses who supply them. Get them to know that English canned fruits are good and then you will win through.

In the course of my experience I have found the Americans to be the finest advertisers in the world. If they have got an article which they consider good they are never afraid to tell people what it is, and they are never afraid to spend money on advertising it to let people know it is good. It is no good having anything, however good it is, gentlemen, unless you tell other people you have got it.

That reminds me of another illustration I saw in an American paper which runs like this:

"The codfish lays a million eggs,
The helpful hen lays one;
The codfish doesn't cackle to tell
What she's done,
And so we scorn the codfish,
But the helpful hen we prize,
Which indicates, to thoughtful minds,
It pays to advertise."

I want to refer to another little matter. Much canned fruit goes into a public institution where the cook is not a trained chef. They have to use it in the way they think best. I would suggest to you that a little book of recipes on the best ways to use certain kinds of fruits would be of the greatest advantage to all these public authorities. It could be distributed very easily by anybody who is selling canned fruits. The wholesale merchants supplying the contracts could distribute them, and they would be appreciated by the people who have to deal with the goods.

DISCUSSION

MR. EDWARDS: I have just found out for the first time that the faults and the worries of canners are not always due to the man who supplies. Whatever is specified or asked for they are pleased to supply, whether it is No. 1 or No. 2.

MR. GOULDEN (Ministry of Agriculture): I would like to reinforce—if I may—the remarks of Mr. Hodges in regard to the trade in English canned goods as carried on by the Marketing Board. The Ministry of Agriculture is also in touch with local authorities, and I will just briefly indicate to you what we have done for the English packers. We have circularised all the local authorities in England and Wales three times during last year, and wherever inquiries have been occasioned by those circular letters the Ministry have attended and assisted the local authorities in any way possible. In addition to that we are endeavouring to satisfy the officials themselves—that is, the people who run the hospitals, the people who are responsible for the executive work in the county councils. They have, within the past year, had articles in county council associations and also in the hospitals. There, again, these articles bring forth inquiries, and Ministry officers are detailed to explain to local authorities exactly what it means. We have just been told that the essential thing is to pack to grade, and the question is as to what grade; there is only one grade in this country, and that is the National Mark grade; that gives buyers all the particulars possible. Perhaps I might briefly epitomise this idea by reading one of the paragraphs of an article which appeared in *The Hospital* recently: "The individual consumer has much to gain by providing National Mark products wherever possible. The advantages to large buyers are even more obvious and important if in marking their tickets they are able to specify produce the grades of which are clearly defined, while the national marking conveys, in effect, a warranty that the quality of the produce is of the grade specified. The central feature of the Agricultural Grading and Marking Act, which started the National Marks scheme, is that it establishes a civil contract between the seller and the buyer, and it is a suitable basis for arbitration or any other action. The use of the National Mark is a definite warranty to the buyer. It is an accepted principle to call attention to, that public authorities should use home products of all kinds, wherever possible, in order to broaden the markets for home supplies and stimulate employment at home. There is no better or more constructive way of carrying this principle into effect than buying, under the mark, the standardised products of our home land." That is to say, that we have the ideal and we have the

machinery and it is up to the canners to see that it is carried out.

THE CHAIRMAN: I am sure it is a very welcome thing that so important a magazine as *The Hospital* has been writing an editorial like that, as you can realise that apart from strict Government and municipal institutions the hospitals are very important consumers who were, a few years ago, rather difficult and suspicious of any new kind of development. I am very glad to know that the forces connected with the hospitals are being brought round to recognise that there is, to some extent, a guarantee of security under the National Mark, and I think that is the answer that Mr. Hodges can, in the future, give to anybody raising a genuine point of difficulty in the municipal offices, or even a man who is trying to make excuses, and that is that, after all, under the National Mark there are, for the time being, certain grades that are fixed, and the canners are open to tests and inspections.

We, who are on the National Mark Committee, know that the tests and inspections that are being carried out amongst the National Mark factories are quite considerable, and therefore I think we can legitimately say that all goods that bear the National Mark are up to grade and standard as soon as you can bring them all under a reasonable system of control and inspection, and I trust that the public authorities will follow the advice that *The Hospital* has given to the hospitals.

Conference with Retailers and Distributors

"It is only by insistence upon quality and value that we can hope to oust foreign tinned goods," said Mr. Robinson, the President of the Grocers' Federation, opening the discussion at the Retailers' and Distributors' Conference. The imported goods had deservedly got a big hold on public favour, he continued, and unless they had produce of equal quality to offer they were not likely to make much headway. The consumer's opinion was the final judgment, from which there was no appeal, and it would be well for the canners and producers to remember that.

The grocer could render valuable service to the producer, added Mr. Robinson, for it was the grocer and his assistants who came into closest touch with the customer.

"There is a wave of enthusiasm throughout the land in our trade to push the sale of British produce. ***You can depend on the support of the grocery trade in general,***" he concluded. ***"I am speaking here with authority. You may be confident that our appearance here this afternoon is proof positive that we will continue, as we have done in the past, to push British products, and especially the products of the canning industry."***

Fish Canning not Lagging Behind.

A reminder of the importance of developing the canning of fish, as well as fruits and vegetables, came from the chairman, Sir Edgar Jones, who pointed out that a section of the Council is working hard at promoting the canning of the products of British fisheries. Although the results achieved in this direction had not been quite so impressive as they had been with fruit, steady work was being done. With regard to brisling, the chief difficulty was to secure supplies; if they could obtain sufficient fish they could make the importation of canned brisling unnecessary.

"The distributors and their representatives can bear in mind that we have a number of fish canners who are putting up excellent products, herring, brisling, mackerel, sild, and other fish products, and they have been doing it for years. They are already doing an export trade against world competition, and the fact that they can do this should establish in the minds of any who are hesitant or doubtful that they need not fear to do their utmost to display and push British canned fish products as much as the fruits and vegetables."

Organising Canned Fruit Production.

"On the fruit and vegetable side, the only difficulty at the moment is the organisation of production for the future so that expansion and production will keep pace with the market. What we ask the distributors to do is, as far as possible, to place the home product foremost in the centre of their windows and foremost on their counters and their shelves. Distributors naturally desire that producers should standardise a few sizes of cans. Our association with the Ministry of Agriculture has enabled us to tighten up and make firm the standardisation we adopted voluntarily a few years ago. So far as fruits are concerned we have definitely standardised the sizes because it is obligatory under the National Mark that only cans of a certain specific standard can be sold."

A Fixed Standard.

"There is only one standard," added Sir Edgar, "the standard that we have laid down as canners. We made it quite clear to the National Mark Committee that the English canners wanted only one standard, and that was the highest and the best. We were not interested in any lower standards of the National Mark. You can take it from me, and it is a point that you can publish with confidence to your consumers, that the regulations of the National Mark Committee are, to my mind, as adequate as to grading, as to syrups, as to processing, and as to contents as the regulations of any advanced packing locality in the world. In addition, the National Mark Committee have a regular system of inspection. Tests are taken unknown to the canners of every canner's pack of every variety. Reports are made. The canners, during the past year, have received most elaborate reports of all their packs supplied to them privately, and the National Mark Committee also received general reports which occupied their attention for a considerable time."

The Practical Side.

Mr. S. W. Smedley, as well as other speakers, referred to the change in the welcome now given by the distributing trade to British canned goods compared with the usual reception only a few years ago. One point he would like cleared up was whether the distributors preferred a multiple number of varieties of fruits of different grades; would it not be better to stick to the best? If canners commenced packing first, second, and third grades it would probably cause complications and dissatisfaction, because one grocer would sell third grade at one price and another first grade at a higher price.

"Canners have to put up their fruits under the fixed grade and under the Ministry's supervision, to enable them to use the National Mark, and it is becoming better known that if you demand the National Mark you will get the highest standard goods," said Mr. Smedley. "Therefore, gentlemen, consider very carefully before you ask us to pack up 1, 2, or 3 varieties. We are all well aware that there are other varieties of fruit, but the canners should only deal with the best. As regards criticism on strawberries, I should welcome many of you gentlemen visiting our factory during the canning of strawberries, because all the discussions probably will not convince you that when those cans are processed the can is full of fruit, so full that to put more in would damage it. I am watching in my own factory, day in and day out, seeing cans filled with strawberries. You know the fruit is tender, and when the lid is pressed on the can it presses the strawberries in, because over the edge of the can there are the largest strawberries, which come above the top. After the hot syrup has been put in and they go through the various hot operations, and the sugar is put in, it contracts the fruit, and when the strawberries come out of the cooker they are decidedly smaller than what they were originally, before they were cooked. The process, which started with the sugar and water only, has then the juice added to it, so that when you see a can of strawberries it is probably only half full of fruit but full of juice.

There is no method I know of where you can have a can full of strawberries with a little syrup only. The only method is to double cook them, when you will have jam instead of fruit. We have heard of foreign fruit being sold at lower prices than English. That may be so of the foreign varieties, but I believe that most English canners are putting on the markets the finest quality, which compares very favourably with any of the peaches, apricots, pears, or pineapples which come from abroad. This is all being done without any subsidy from our Government; in England I do not know of anyone who has received a penny piece from the Government in any shape or form. Certainly we have not had any, and I do not know of anyone else who has; but in foreign countries, such as California, I believe they are getting a subsidy for their goods. That is, apparently, the explanation why they can sell, at times, more cheaply than we can."

Another speaker, while agreeing with Mr. Smedley that it would be inadvisable to multiply the grades of fruit packed, suggested that it would be worth while for the Technical Committee to consider the possibility of having two grades of syrup. The National Mark grade could have a 45 per cent. syrup, and there could also be an extra heavy grade with 10 per cent. extra syrup. The exact amount of syrup would vary, of course, with particular fruits.

Co-ordination.

The chairman of the Canners' Committee, Mr. G. Salmon, replied to numerous points raised by previous speakers.

"During the last five years," he said, "we have always endeavoured to get in touch with every individual interested in any kind of manufacture as applied to the canning industry. For instance, the tinplate manufacturers, the can makers, the grower, the sugar beet man by meeting together, and by confiding in each other, get to know the best methods that suit the public. It is not what we think, but what the public require. With regard to the special grading used for National Mark fruit, we, as a Council, feel that there is only one grade of fruit that we should pack, and that is the best. That has been the policy of the Food Canning Council since its inception.

The Syrup Controversy.

"We have had difficulty in regard to the syrups. There have been controversies innumerable about the strength of syrups, but we think that if we decide on an extra heavy strength and a heavy strength, and if we keep to those two classes of syrups, we shall be on safe grounds. A great many canners are under the impression that one strength of syrup is sufficient, because a lot of the distributors are charging as much for the lower strength of syrup as they do for the higher grade. So, by keeping to the one standard of fruits and syrups we feel sure we are on very safe ground.

The Man Behind the Counter.

"There is no doubt that the assistant behind the counter is a very vital factor in pushing the trade in English canned fruit. We do not pretend to tell them their job, but it is surprising what they can do in pushing one or two kinds of English fruits per year as against the imported Californian pack of pears, peaches, and apricots. We shall never thoroughly do without having a certain number of that pack, because people will have a choice. A housewife is not going to have plums, pears, and loganberries week after week and year after year, but if we can get half the trade in English fruits as against what is purchased in Californian fruits we shall do a great deal for the benefit of the country, and, in a way, we shall do ten times our trade. In my opinion, it would be very dangerous for a housekeeper to start canning fruit at home. We can do that ourselves as canners. We are prepared to give the public the quality they want; for the housekeeper to do it at home would be a very dangerous proceeding. She may get the canning trade a very bad name, and all the good we have done during the past few years may come to nothing.

"There has been a request to have the National Mark applied to dried peas in a can. The National Mark Council have always been against that. The National Canning Council have always applied for the peas to be taken straight from the garden and put into the can finished. That is our impression upon the Food Canning Council, and we are endeavouring to do that.

"I find that when travelling on a railway it does not matter which railway it is in this country, or when I stay at any hotel, I very rarely see an English strawberry or plum or anything of that sort. Why is it? Cannot the distributors get in contact with the railway managers, or the hotel managers, and encourage them to use British canned fruits, or does it pay them better to have foreign fruit to give to their customers? In every hotel I have been in this year, and I have been in some dozens, there has never been any English fruit given to us. The same remark applies to the railway trains also. I feel there is a huge opportunity awaiting us in that direction.

"Another point is with respect to displays in shops. If distributors will give English fruits, fish, or peas displays in shop windows, that is one of the biggest selling lines there can be. There should be a display of the goods in the shop window, and then, when the people get inside the shop, they should be able to see the goods on the counter. There is no doubt that has a great influence upon the housewife in making her purchases."

"With regard to fish," concluded Mr. Salmon, "I have always thought that the herring, in England, is one of the finest sources of food we have in the country. Herrings are far better in a can than in the sea, where they are bringing about no result at all."

"It seems to me," said Mr. A. M. Wood (Tyne Brand Products, North Shields), "that there is one point we have missed in regard to canned fruit in particular. With the general election which has just taken place resulting in a huge majority in favour of British produce, it seems to me that the Canning Council have a valuable opportunity in linking up all round. We heard Mr. Taylor, from the Board of Agriculture, speak this morning. Perhaps we may have the connecting link there with the powers that be.

"Then, as regards apricots and pears, is it not time that some tax was imposed upon the foreign peaches and pears? Perhaps the Council would take cognisance of that point.

Progress in Fish Packing.

"It was very nice to hear Mr. Salmon speak about the food value of herrings. The Tyne Brand Company do labour very strongly the vitamin value of the English herring.

"As regards pilchards, I am going to read a letter to you from a Californian packer. It explains the reason for the cheapness of the price of the Californian pilchard. I hope that the Canning Council will take due note of it, and consult with the Empire Marketing Board to see what can be done about it.

> "'The Fish and Game Laws of the State of California demand that for every ton of fresh pilchards taken from Californian waters, canners produce 13½ cases of 48/15 oz. oval tins, or the equivalent in weight in other sizes. The residue may be used in the manufacture of by-products such as pilchard oil and pilchard meal. When fish are in prime condition it requires about 75 per cent. of each ton to pack 13½ cases, leaving about 25 per cent. which may be used in the manufacture of by-products.
>
> "'In past years many canners have sold their tinned goods at cost, and in many instances at less than cost, but have been able to recover the loss as well as make a small profit on the sale of their by-products.'

"That is the position with regard to Californian pilchards, and why you get such a ridiculously low figure with them. So I do think that the Canning Council, both in regard to fruit and fish, should get the Government to consider very seriously which is the best and which is the most useful course for the country to take. Will they allow this kind

of thing to go on or will they support the British canners both for fruit and for fish?"

MR. GOLBORNE (Ministry of Agriculture) was also one of those who recognised the importance of cultivating the acquaintance of the retailer. "The grocers' assistant has been referred to as someone who has been neglected," he said, "and I was wondering whether it is possible this afternoon to say that he shall not be neglected in the future. The Grocers' Association has always been helpful to the Government. The Institute of Certified Grocers has helped the Government upon many occasions. Their students are given a scholarship by the Ministry, and a portion of the advantages of that scholarship is to take the successful student on a tour of the food-producing areas of Great Britain, and included in the itinerary is a visit to a canning factory.

"We do realise that the grocers' assistant is an important factor. Up and down the country there have been something like 100 National Mark weeks, and the competitions have almost invariably included a prize for window dressing. So that the grocers' assistant has been considered.

"During the next few months my colleagues of the Ministry, and also members of the Empire Marketing Board, will be visiting various associations to explain the reasons behind the Empire Movement and also the National Mark Scheme. I am wondering whether those associations are precluded, by their rules, from inviting grocers' assistants to attend their meetings in order that the messages that may be given there may go directly to the man who is in contact with the customer."

More About Fish.

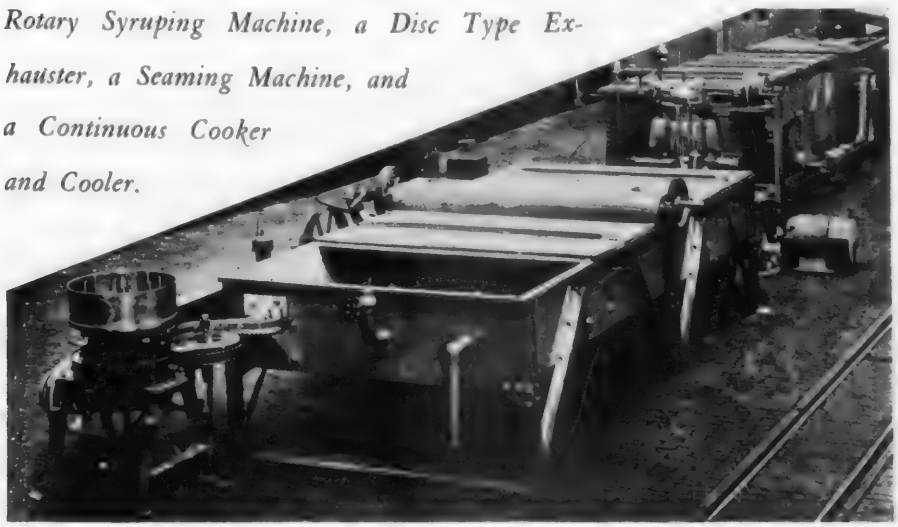
MR. C. W. BANKS gave some useful information on brisling canning. "Our factories have been canning them for some considerable time," he said, "and our total output is 10 million cans per year. I think that 10 million cans per annum is not quite an experimental stage.

"You all know that the sardine does its best work when it is well oiled. Brisling and sild, each in its little bath of oil, are just as good as any foreign sardine. We can produce brisling and sild. Brisling is the pure British sprat, but unfortunately the sprat is cast up on our shores at infrequent intervals, and the Press gets hold of the story that there are millions of sprats thrown on the shore and we do not know what to do with them. People get the idea that the sprat is a poor little thing, but it is the actual Norwegian brisling for which you pay 40s. a case. The Norwegians work their profit out of the brisling every three years. They get a good catch. They pack all they possibly can, and they make their money out of brisling. They change a pound note by selling you sild at 20s. a case. The cost of the Norwegians is exactly the same, with the exception that the cost of manufacture of the brisling is just twice what they pay for the sild. They make all their money on brisling, and give you their sild back again for nothing. I do not know why. It is a most amazing thing.

"***I have been round the exhibition, and I would just like to say one word to the British manufacturer of machinery. There is not one item in the exhibition which is of any interest to the fish canners.*** I hope that by next year the British manufacturers and the British engineers will have something to show the fish canners as well as the fruit canners. There is no washing machine, and there is no hermetic sealing machine for irregularly shaped cans. I think that at our own place we manufacture twelve different sized tins, all with a lift on the end. I do not think that any of the British devisers of hermetically sealing machines have taken that lift on the lip into consideration. There is a field for it. There is no head cutting machine, and there are no tomato cutting machines, so that there is scope there."

This concluded the discussion, and Mr. Robinson, in replying to the various points raised, said, if one thing had emerged as a result of the meeting, it was the extraordinary unanimity of everyone concerned in the desire to push British produce. Every speaker had confirmed the point, and it was an important and satisfactory feature of the meeting. He wished to congratulate the organisers on the excellent results of the Conference, and he was sure all the grocers would return to their district associations imbued with the desire to sell more British produce.

The photograph below shows a canning line for a fruit pack displayed in operation at the Park Works of Messrs. Mather and Platt, Ltd., on the occasion of the Canners' Convention in Manchester. This line includes a Rotary Syruping Machine, a Disc Type Exhauster, a Seaming Machine, and a Continuous Cooker and Cooler.



Correspondence

To the Editor.

DEAR SIR, *November* 10, 1931.

At the Manchester Conference, which was so exceedingly successful, many matters of general interest were discussed. Owing to the pressure of business, however, it was impossible to follow up the various subjects as fully as one could have wished. With your permission I propose to make one or two remarks arising out of the discussions at the Conferences.

RUSTING OF EXPORT TINS

An interesting discussion on the advantages of fibre board packing took place on Wednesday morning, at which the advantage of the fibre outer was explained, particularly in its rust-preventing qualities. Sir Edgar Jones, however, pointed out that when tins are packed in a cold country and subsequently passed through the tropics, condensation is bound to take place inside the outer package, and this is liable to set up rust.

The suggestion I wish to make is that if the tins were stove lacquered on the outside the possibility of rusting would be eliminated. The slight extra cost of the stoved lacquer would, I feel sure, more than pay for itself in protecting the tin and preventing the spotting or discoloration of the label. This process has been in use by several firms for some time and has been very satisfactory.

UNIFORMITY OF COLOUR IN CANNED FRUIT

Some interesting suggestions were made as to the necessity of establishing a standard colour for coloured fruits packed in tins. Complaint was made that considerable variation occurs, and the necessity of some standard was extremely desirable.

Quite apart from the question of added colour or the natural variation in the colour of the same class of fruit, here, again, lacquer plays a very important part. A double-lacquered can preserves the natural colour in a most wonderful degree. Long research and tests at Campden have proved this and, of course, it is well known to most of your readers. I only mention it to suggest that, even if you get your standard colour, it would be necessary to double lacquer your cans in order to preserve this colour and keep it at its full strength.

LITHOGRAPHED CANS VERSUS LABELS

This question was brought forward in a burst of enthusiasm by a loquacious competitor of mine, who apparently did not know that the process had been in use on the Continent for the last twenty years or more. The can decorated with inks and varnish that will stand up to retorting processes is used both on the Continent and in America. The result, whilst satisfactory in many ways, cannot be compared with the full gloss and rich decoration of the printed label with which the British packer is familiar. In addition, there is the danger of the marking of the tin by the various processes from retorting to packing. Quite apart from this danger there is a much broader question—namely, the necessity for having to carry very much larger stocks of packages than in the case of the labelled can. That is, however, a matter between the can maker and canner. I only mention it because I do not want the canners to be led away by the sudden bursts of enthusiasm from which we are all liable to suffer at Conference times.

The matter was discussed at Leicester last year, when I pointed out the " snags " appertaining to the lithographed can for high-processing work. They include the probable hindrance to mass-production, the necessity of holding larger stocks by can maker and canner, but, above all, the psychological effect on retailer and consumer of changing the style and finish of the label with which they are so familiar.

It is this last reason which impels me to restrain a natural desire to put a " new " varnish finish on the market and to secure fresh trade at the expense of the label manufacturer. If and when there is a genuine demand on the part of the canner for lithographed cans, my firm's experience of supplying this type of lacquer abroad for the last twenty years is at the service of the home trade.

I need hardly say that very considerable improvements have been made during the last year or two in the finish of the varnishes, lacquers, and inks used for cans which have to be retorted. Even as recently as the last printing exhibition I discussed the matter with several of the leading ink firms in this country, and I can testify that their products have been considerably improved since then.

Yours faithfully,
A. LL. MATTHISON,
Director, Arthur Holden and Sons, Ltd.

To the Editor.

DEAR SIR, *November* 11, 1931.

I was very much interested in your excellent letter in *The Times*, and, with your permission, I would like to say the following:

I believe many, many years will pass before the canning industry will give as much satisfaction to consumers as it is probably already giving to its shareholders. No business of this nature can last, unless quality be the foundation. Of course, propaganda and perpetual advertising at the expense of the general public will also bring in dividends, but is this to the good of the people?

There seems to be a craze for canning *en masse*, irrespective of whether the article itself, its quality, or technical applications are suitable for the tin, health, or palate. When rabbits are plentiful and cheap, in the tin they go. When somebody has accidentally caught a tunny fish, the papers lend their pages to the advisability of using it for the tin. Technical questions are not taken into consideration at all.

There is already a variety of fish in this country

most suitable for smoking—a method of preserving so much cheaper, simpler, and more palatable than the tinned article—and yet what are the results? Raw kippers, raw haddocks, raw salmon, impaired digestion, causes of many ailments of the alimentary tract and limited demand for these articles.

You know just as well as I do that with a little scientific knowledge, goodwill, and genuine desire to help the people and country, these smoked articles of food could be produced of far superior quality, but if improvements are not adopted in connection with the simple method of smoking, can we expect greater exertions in matters pertaining to such technical complications as canning?

Yours faithfully,
D. A. RUFFMAN,
Managing Director, Supex, Ltd.

To the Editor.

DEAR SIR, *November* 6, 1931.

I was greatly interested in your paragraph on "Meat and Fish" in the present number of FOOD MANUFACTURE and in your letter to *The Times* of November 4, deploring the lack of enterprise in the canning industry of these important commodities.

Having travelled in many lands where one depends entirely on tinned goods for months together, I have often wondered at the lack of enterprise in the meat canning industry. The meat is so unappetisingly prepared and there is little variety. It seems that no one with a touch of imagination has ever had a controlling hand in their preparation.

The most obvious failing is with regard to the gravy or sauces in which the meat is preserved. In spite of the fact that canned meats depend for their appetising almost entirely on the gravy in which they are served, I have never found the gravy in canned meats even bearable without additional flavouring or adjuncts.

Now the people who most use canned meats are just the people who cannot as a rule give this extra skill and care to their food, and I see no reason why it should be necessary. It should be possible to make canned curries, fricassees, stews, and hot-pots so delicious that no additions would be required. There would quickly be a large demand from many lands for such goods.

Yours faithfully,
(MRS.) MARY LAFFAN.

1, MARSHAM STREET,
WESTMINSTER, S.W. 1.

To the Editor.

DEAR SIR,

I have just seen your letter to *The Times* of November 4, and your plea for the early provision of a technical research station, on the lines of Campden, to provide those interested in the packing (including canning) of meats and fish with reliable information and guidance, is one which has my wholehearted support.

In my capacity as demonstrator in Fruit and Vegetable Preservation to the National Federation of Women's Institutes, I am continually being asked for instruction in bottling chickens. In Canada it is generally practised, and a Canadian woman I met this summer told me she had bottled chicken for twenty years without a failure. I have experimented successfully, using the intermittent method of sterilisation and also sterilising under 10 to 15 lbs. pressure, but until we have reliable investigation behind us people are afraid of any possible danger and do not know enough to guard against it. Undoubtedly, there is a good industry lost for the want of a research station to guide us. Many people want to preserve young chickens, seeing in this a more profitable investment than keeping them until fully grown.

I hope your letter will have some effect, for it concerns a really urgent need.

Yours truly,
I. ELIZABETH CRANSWICK.

The letter referred to as being published in "The Times" of November 4 is reproduced below.

TO THE EDITOR OF *THE TIMES*

SIR,

Widespread interest will again be aroused in the fruit and vegetable preserving, and more especially canning, industries by the holding of the Imperial Fruit Show and Canners' Convention at Manchester this week. Canners, growers, and scientists will meet to discuss technical problems associated with the practice of canning fruits and vegetables. There are, of course, many such problems awaiting solution, in spite of the remarkable progress made by the investigations at the Campden and Cambridge research stations, rendered possible by the harmonious efforts of the Ministry of Agriculture, the National Food Canning Council, the Food Investigation Board, and the members of the industry itself. The Campden station, it will be recollected, concerns itself with technical matters directly bearing on large-scale practice, while the Low Temperature Research Station at Cambridge concentrates on basic principles of a more purely scientific character. No doubt the next twelve months will show even greater progress in both the expansion of the industry and the elucidation of its technical difficulties.

Thus, the present position and further outlook of English fruit and vegetable canning are most gratifying. Now that it is firmly on its feet and well able to look after itself, the time has come to take stock of the closely related fish and meat preserving, including canning, industries. At present, in spite of their enormous potentialities, they are in a deplorably backward condition; they are suffering from a lack of unified effort and a failure to provide them with a centre for information, investigation, and instruction on lines similar to those established at Campden, Stavanger in Norway, Wesermünde in Germany, Halifax and Prince Rupert in Canada, and Berkeley, Chicago, Washington, and Seattle in U.S.A. It is true that valuable work of a fundamental nature is being carried out under the auspices of the Food Investigation Board, but this is not enough. What is urgently required is a "practical" station where the fish and meat industries may have their special technical problems taken in hand and from which reliable information may be obtained to serve as a basis for the launching of enterprises in a field that offers no less promise of success than does the preserving of fruits and vegetables. It is to be hoped that no time will be lost in putting into operation a scheme whereby these requirements may be realised.

I am yours faithfully,
H. B. CRONSHAW, B.A., PH.D., A.I.C.,
Editor of FOOD MANUFACTURE.

231-2, Strand, W.C. 2.
November 1.

Enquiries

Enquiries are dealt with immediately on receipt, and the desired information is communicated in full by private letter. The replies given below are merely brief abstracts or indications that the names and addresses, or whatever may have been requested, have been supplied. Any further information supplied to us relating to the questions appearing below willbe passed on to the enquirers. **N.B.—Enquirers are requested to use the special form in the advertisement section.**

411. *Where can we obtain cold liquid gum or glue for labelling on very hot tin (about 200° F.) without eventual discoloration of the label?* (London.)

Names of suitable firms submitted.

412. *Will you please supply us with the names of firms manufacturing small wooden casks for food products, such as custard powder, mustard, etc. The size we require is about 9 to 12 lbs., or, say, 8×10 inches.* (London.)

Names supplied.

413. *Required, references to literature or publications on the preparation of hams and gammons for tinning purposes.* (London.)

So far as we know, there is nothing of any practical value.

414. *Kindly advise us of firms able to supply an automatic box washing machine. The boxes are of various sizes up to about* $2\frac{1}{2}$ *or* $3\times3\frac{1}{2}\times1$ *ft.*

Various firms recommended.

415. *We wish to have formulæ for the manufacture of custard powders and ice-cream powders.* (Kent.)

The basis of custard powder is usually a mixture of two or more of the following: Cornflour, arrowroot, rice flour, and potato flour, together with, in some cases, whole dried powdered eggs, sugar, or gum tragacanth. The mixture is suitably coloured and flavoured.

Thus 60 parts by weight of cornflour and 40 parts of arrowroot might be used as a basis, or equal parts of fine rice flour and potato flour, generally the former.

The colouring matter is usually egg yellow and the flavour vanilla or almond. Mixing should be very intimate and thorough, especially with reference to the colour and flavour. Take particular note of the temperature at which the powder gelatinises, and the colour of the paste.

As regards ice-cream powders, we would refer you to p. 337 of the November issue.

416. *Will you please give us the names of makers of round cardboard containers with metal bottom and top, lever lid; capacity 14 lbs. jam.* (Manchester.)

Likely names submitted.

417. *We are contemplating the manufacture of a jelly marmalade, and would be glad to receive particulars of recipes and processes.* (Yorkshire.)

Reference should be made to an article on the subject published in the May, 1930, issue, p. 131.

418. *We should be glad to have recipes for granulated gravy, and also for sponge cake mixture.* (Baltimore, U.S.A.)

For the former we would refer the enquirer to the recipe published in the May, 1931, issue.

As regards sponge cake mixture, one recipe is: Equal parts by weight of sugar and flour; 12 eggs.

The sugar is warmed, and, while warming, the flour is sifted twice to aerate it. The eggs and sugar are creamed for twenty minutes and then the flour is mixed in. Other recipes and general information are given in Bennion and Stewart's *Cake Manufacture and Small Goods Production.*

419. *Required, recipe for a good brass polish, either paste or liquid, preferably the latter.* (Liverpool.)

The following may serve as a basis for experiment: Melt together 2 lbs. palm oil and 2 lbs. vaseline. Then stir in 1 lb. of polishing rouge, $\frac{1}{2}$ lb. tripoli, 1 oz. oxalic acid powder, and a suitable quantity of perfume. Do not pour too hot, as the solids will tend to settle.

420. *We shall be obliged if you will give us names of British manufacturers of hydrogenated oils.* (Switzerland.)

Some information supplied.

421. *We observe that under Enquiry No. 305 you have given one of your subscribers the names of manufacturers of machines for making beef cubes. We should be glad to have these names.* (London.)

Information supplied.

422. *Under separate cover we are sending you a small jar, and shall be obliged if you can let us know where supplies of these can be obtained.* (Edinburgh.)

Suggestions made.

423. *Kindly favour us with further information concerning the moisture testing of flour, as mentioned in your October number, p. 293.* (Surrey.)

There are two rapid methods: (1) Distillation; (2) electrical.

References to Distillation.—W. Normann, *Z. Angew. Chem.*, 1923, vol. 36, p. 519; 1925, vol. 38, p. 380. E. Liese, *Ch. Ztg.*, 1923, vol. 47, p. 438. Aufhäuser, *Z. Angew. Chem.*, 1923, vol. 36, p. 197. Tausz and Rumm, *Z. Angew. Chem.*, 1926, vol. 39, p. 155. Pritzker and Jungkung, *Ch. Ztg.*, 1926, vol. 50, p. 962; 1929, vol. 53, p. 603. Holtappel, *Ch. Zentr.*, 1926, vol. 11, p. 1212. Fairbrother and Wood, *Ind. Chem.*, 1930, vol. 6, p. 442; 1931, p. 168. Friedrichs, *Ch. Ztg.*, 1929, vol. 53, p. 287.

References to Electrical.—Berliner and Rüter, "Ueber Feuchtigkeits bestimmungen in Weizen und Roggen mit dem D.K. apparat," *Z. ges. Muhlenwesen*, 1929, vol. 6, p. 1. Briggs, "An Electrical Resistance Method for the Rapid Determination of the Moisture Content of Grain," U.S. Dept. Agr. Bur. of Plant, Ind. Cir., 1908, No. 20. Burton and Pitt, "A New Method for the Rapid Estimation of Moisture in Wheat," *Can. J. Research*, 1929, vol. 1, p. 155. Coleman, "Recent Development in Moisture Testing Apparatus," *Amer. Elevator and Grain Trade*, 1930, vol. 49, p. 234. Zeleny, "An Electrical Method for the Measurement of the Amount of Moisture in Grain and other Materials," *Minn. Eng.*, vol. 17, p. 163. Coleman, "Quick Moisture Methods," *Cereal Chemistry*, 1931, vol. 8, p. 315.

424. *Can you inform us where we can obtain "Mellow Freeze," an ingredient for making ice-cream?* (Newcastle-on-Tyne.)

From Messrs. Walkers, Ltd., 5, Laurel Road, Liverpool.

425. *Will you kindly put us in touch with the manufacturers of the "Colombia" brand of condensed milk.* (Malta.)

We have been unable to trace this particular brand.

426. *Can you give us any idea of the cause of the development of white specks in anchovy sauce?* (New Zealand.)

We are under the impression that these consist of tyrosine (an amino acid), which has crystallised out in radially arranged aggregates of needles. Apparently there are various contributing causes. Attention should be given to the time elapsing after catching the fish. No doubt the particular variety of fish used makes a difference. Anyhow, it is a matter for research, and we do not know if the problem has been satisfactorily solved.

427. *What ingredient is used in the preparation of free running table salt?* (London.)

We have dealt with this question previously. It is stated that tri-basic calcium phosphate is used in connection with the preparation of such salt.

428. *We should be obliged if you could put us in touch with the manufacturers of a small hand-driven machine for the removing of stones from dates.* (Manchester.)

Suggestions made.

429. *Can you give us a formula for a good cake powder?* (St. Leonards.)

Soft flour	140 lbs.
Cream of tartar	2 lbs. 14 ozs.
Bicarbonate of soda	1 lb. 6 ozs.
Castor sugar	70 lbs.

Egg colour and flavour as desired.

430. *We would appreciate the name of a textbook on the preparation of tinned cream.* (Newcastle.)

There is no book on the subject. An article will be published in the April issue of this journal dealing with the latest procedure.

431. *We would esteem it a favour if you could forward any information on the production of powdered soups.* (Australia.)

This is the subject of an article to appear shortly in this journal. The basis of dried soups is usually pea or lentil flour. Dried tomato, onion, spinach, or some other vegetable powder may be added. To obtain a meat flavour, meat extract or glutamate preparation may be used. This is a big subject, as so many variations are possible—hence we have arranged for an article to go into the matter thoroughly.

432. *Names of manufacturers required who would be able to supply corks for tomato sauce bottles (full particulars of these corks accompanied the enquiry.* (Rhodesia.)

Recommendations made.

433. *We understand that white invert sugar is used in the manufacture of chocolate. We should be glad of particulars.* (Liverpool.)

The information requested was supplied. A great deal has also been published, especially in America, dealing with this subject, and various patents have been taken out.

434. *Request for a recipe for tomato sauce for pork and beans.* (London.)

This was supplied.

435. *Required, recipes using fresh cream in the preparation of salad cream and mayonnaise.* (Glasgow.)

Below are two which we think will serve as a basis for experiment:

Mayonnaise Dressing.

Cream	1 pint
Vinegar	½ pint
Yolks of eggs	6 pints
Salad oil	1 oz.
Sugar	1 oz.
Salt	1 oz.
Mustard	½ oz.

Mix the oil, sugar, salt, and mustard well together in a basin, or, on a large scale, in a jacketted pan; add the well-beaten yolks of eggs; then the vinegar, and lastly the cream. Stir the mixture, heating with hot water, till the temperature reaches 165° F. and it acquires the consistency of custard. If this dressing is to be bottled for long, it will require slightly more acid, as the keeping properties are dependent on the *p*H.

Mayonnaise Sauce.

Yolks of eggs	4
French mustard	2 drams
Salt	2 drams
Pepper	to taste
Tarragon vinegar	1 oz.
Best olive oil	2 pints
Cream	1 oz.

Place the yolk of eggs, mustard, salt, and pepper in a basin; stir quickly with a wooden stirrer; add the oil, at first drop by drop, then more rapidly, and at intervals a few drops of vinegar. By stirring well the mixture should acquire the consistency of thick cream. Finally, add the cream, stirring all the time. If it is required to keep this mixture for long, more acid will be required. The emulsion will be made more rapidly if a little of a former batch be used as a starter.

Poultry Canning (*Continued from page* 354)

of the lowest temperature of processing compatible with that grade of sterilisation (and in some cases this does not mean the entire absence of spores of micro-organisms) which will ensure practically unlimited keeping properties. A long sterilisation at the lowest possible temperature (even though it involves a certain duplication of plant) is infinitely preferable to a short and sharp sterilisation at high temperature.

The final step in actual canning operations is the cooling of the cans. This may be done by "pressure cooling"—undoubtedly the best and safest way—or otherwise. It may be of interest, in passing, to mention that in certain cases cooling may be effected simply by leaving the cans in the air, after they have emerged from the retort, without prejudice either to the product or the "collapse" of the can.

Processing Times and Temperatures

WE HAVE received from K. F. Meyer, of the George Williams Hooper Foundation for Medical Research, University of California, a copy of Bulletin No. 26-L (National Canners' Association Research Laboratory, January, 1930), entitled *Processes for Non-Acid Canned Foods.*

In this bulletin are presented the sterilising processes for non-acid foods adopted by the Board of Directors of the National Canners' Association at their meeting in Chicago on January 18, 1930, to be effective until April 1, 1931, by which date it was expected that the list of processes would be extended by the inclusion of data resulting from experimental work now in progress.

Prefacing the list of processes are approved recommendations with respect to equipment and its operation, as well as definitions of the terms used in the processing tables. This information is essential to the correct interpretation and proper use of the processes given in the bulletin.

Trade Notes

Air Filters.

An order for twenty-nine air filters with a total capacity of over 350,000 cu. ft. of air per minute, to be installed in one super-building in London, has been received by the Visco Engineering Co., Ltd.

This, it is believed, is easily the largest air filter installation ever ordered for, or installed in, one building in this country.

* * *

British Plant for Holland.

Industrial Waste Eliminators, Ltd., of London, W.C. 1, announce that, against considerable Continental competition, they succeeded in securing a contract for the supply of an "Iwel" patent dry process plant for Purmerend, Holland, which is to be employed for the treatment of condemned carcases, fallen animals, etc.

This installation, which is being installed in order to comply with Dutch Government laws and is more or less under the auspices of the Government, is one of several which will be located throughout Holland, and the order was placed only after full investigation of German and Swiss wet rendering and benzine systems.

* * *

Among others, recent orders have also been received for "Iwel-Laabs" plants from the Winterswijk Municipality, Holland, this being a duplicate unit of a plant which they already have running: a plant which will be installed at the Stanley Abattoir, Liverpool, for the utilisation of the by-products; and one for the Morecambe and Heysham Municipality for the utilisation of not only animal by-products, but of fish waste, etc.

* * *

Glass in the Foodstuffs Industry.

An exhibition of modern technical and artistic glasses is now in progress at the Science Museum, South Kensington, London, to illustrate the applications of modern science to glass technology. On Thursday afternoons, at 4.45 p.m., public lectures on various aspects of the glass industry are being given by well-known experts. On Thursday, December 10, a lecture will be given on "Glass in the Foodstuffs Industry" by E. A. Coad-Pryor, Esq., B.A., (the United Glass Bottle Manufacturers, Ltd.).

* * *

British Chemical Plant Exhibition.

A request has been sent to all exhibitors asking for their views on:

(*a*) The value of the exhibition to them.

(*b*) Their opinion as to the best interval between future exhibitions.

(*c*) A mutual arrangement to avoid clashing by arranging national chemical plant exhibitions in England, France, and Germany, in different years.

(*d*) Suggestions for improvement in regard to the organisation of future exhibitions.

Fifty-four firms were asked for their opinions; of which fifteen firms did not reply, and twenty-eight firms expressed satisfaction with the results, although the full effect, naturally, will not be felt for some time.

The following numbers of firms considered the interval between future exhibitions should be:

4-5 years	2
3-4 ,, ...	1
3 ,, ...	18
2 ,, ...	3
Annually	2
No opinion	13

Nine firms approved the suggested arrangements to avoid clashing with Continental exhibitions; three firms, further, being definitely of the opinion that the exhibition in this country should be confined to British firms. Fourteen firms expressed their definite willingness to participate in future exhibitions, while a further six firms would probably do so.

Several firms congratulated the committee on the detailed organisation and the amount of assistance afforded them as compared with other exhibitions, while others praised the attendance of exactly the right type of visitor.

Various other suggestions have been received, and will be considered by the committee for future use; in particular, the value was stressed of a special meeting, such as the jubilee celebrations, as an attraction which intensified publicity. Other points include the improvement of the catalogue as an advertising medium, the restriction of entry to British firms, alteration in hours of opening, the award of medals and diplomas, improved direction signs, all exhibits being on one floor, the restriction or widening of the scope of the exhibition, other centres than London, etc. In view of the promises of support for a future exhibition, a survey has already been made of available halls, with the provisional idea of an exhibition in 1934. This should enable the managing committee for the next exhibition to select a really suitable hall, if such exists, and so avoid the main difficulties encountered owing to the inherent disadvantages in the construction of Central Hall.

* * *

Personal.

Mr. Barlow, of the Metal Box Co., Ltd., is now in America on a business trip which is likely to last for about two months.

* * *

Mr. David Hamilton has been appointed London representative of Birmal Chemical Engineers.

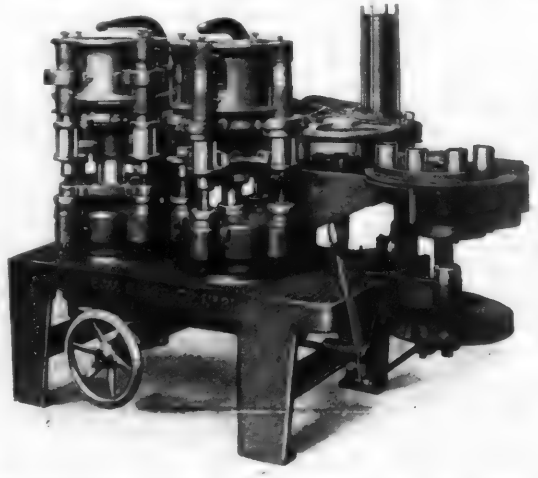
* * *

An increased duty on canned goods is expected to be levied on imports at Shanghai, according to a contemporary. This would further depress trade, as the volume of canned foods business for the first seven months of 1931 was 40 per cent. below the 1930 rate of business, and the 1930 trade in this line was 30 per cent. below 1929.

* * *

Engineering Exhibition at Cardiff.

At the Cardiff Engineering Exhibition last month Messrs. G. A. Harvey and Co. (London), Ltd., showed an extensive range of perforated metals. This firm specialises in both perforated metal and woven wire suitable for screening, grinding, separating, and



The Bliss High-Speed Double Seamer described on Page 334 of the November Issue.

filtering such widely different commodities, as coal, coke, gravel, ore, sugar, food products, and fine chemicals. A selected range of ornamental patterns for radiator covers, pipe guards, grilles, and ventilating panels were also on view.

Apart from heavy plate work associated with the chemical and allied trades, Messrs. Harvey have a unique experience in all kinds of sheet metal work, wire work, tank making, and galvanising, the latter being concisely dealt with in their brochure recently issued—No. 518.

* * *

Filling and Packaging Machines.

The packaging of a food product can often offer almost as much difficulty as its manufacture. Its acidity or alkalinity may bar the use of certain metals; it may be so volatile as to be difficult to fill without evaporation, or so viscous as hardly to move at all. If it is a powder, fresh problems of preventing the escape of dust into the atmosphere of the filling room may arise.

One firm which has had very extensive experience in solving all manner of filling problems, and which numbers among its customers firms whose names are household words in the food industries, is the Albro Filling and Engineering Co., Ltd., of Holloway, N. 7. Well over seventy different types of filling machines are manufactured by them; one of the most generally applied is the rotary vacuum standard type. The advantages of vacuum filling in the detection of faulty containers, leakage, and mess prevention are well known, and this type can fill containers ranging from half-ounce to half-gallon capacities at rates of from 2,000 to 5,000 per hour. The "rotary monoceptor" is the standard Albro machine for free-flowing liquids such as whisky, pasteurised milk, which are filled at the rate of 6,000 bottles per hour or more. A feature of Albro fillers is the gentle way in which the bottles are lifted up to the suction and filler nozzles; with ordinary cam-operated lifts the action is apt to be rough and unsteady, with possibilities of chipped bottles and nipped fingers, but on the Albro types this has been eliminated.

Quite viscous liquids, such as oils and creams, can also be vacuum filled; a single head machine for this duty will have an output varying with the size of the bottle, but averaging about 900 per hour. This, of course, can be multiplied as desired, according to the number of heads used. For similar duties, but with much higher outputs, are the Albro travelling fillers, which fill tins and jars with hot or cold liquids, and creams, at up to 15,000 containers per hour. A weight-operated filler, requiring no power, on the other hand, can be supplied to fill tins with heavy oily substances at speeds of from 300 to 1,000 per hour, and these are capable of handling containers of up to 70 lb. capacity.

Powders, such as cornflour and custard powder are handled by several types of vacuum fillers, so designed that there is no possibility of any of the powder escaping into the air to create dust. These are vacuum operated, handling packages up to 1 lb. in weight at the rate of 10 per minute for each filling head, while smaller containers are filled correspondingly more rapidly. Other products of the firm include fish and meat paste fillers, bottle rinsing, tin-lidding, and stopper-pressing conveyors, vacuum pumps, etc., and readers with filling problems to solve will find considerable assistance in the firm's lists.

* * *

A New High-Speed Steam Engine.

The Drysdale "Thermall" steam engine is described in a brochure recently issued by Messrs. Drysdale and Co., Ltd., of Glasgow. This new engine is of the high-speed, vertical enclosed forced lubrication type, and it is designed with the aim of providing an engine which, while having a considerably more economical steam consumption than ordinary single cylinder units, should be no less simple and reliable and little more costly. All three of these requirements, it is said, have been met in the "Thermall" engine, which is claimed to have a consumption 25 per cent. less than normal existing types, while being no more complicated, at only a slightly higher price.

One of the principal features of the new engine is the arrangement of the separate steam and exhaust valves, which are situated side by side at the front of the engine, operated by radial valve gear from the crank webs, which are utilised as eccentrics. The advantages claimed for this arrangement are: (1) reduction of temperature changes; (2) less live steam leakage; (3) better cylinder drainage and general increased efficiency resulting from the better steam flow and reduction of "wire-drawing." The engine is compact but accessible, and is specially suited for direct coupling to centrifugal pumps, electric generators, etc., and in cases where higher power is required is available in twin cylinder or compound form.

* * *

We are informed by the United Phosphaté and Malt Co., Ltd., Uphosma House, King's Cross, N. 1, that their general manager, Mr. W. J. Holmes, was elected a director of the company at a general meeting on October 28, 1931.

* * *

Canning Equipment.

A new catalogue of equipment for the canning industry has been issued by F. J. Ballard and Co., Ltd., of Tividale, Tipton, Staffs. Much useful information will be found in this catalogue. Thus a description is given of the various operations of an automatic fruit canning line. Particulars are given concerning water exhausters, variable discharge cookers and coolers, and also other types of this plant, fruit washer, pea shelling machine, pea cleaners, pea grading machine, blanching machine, retorts, can boxer, can drainer, etc.

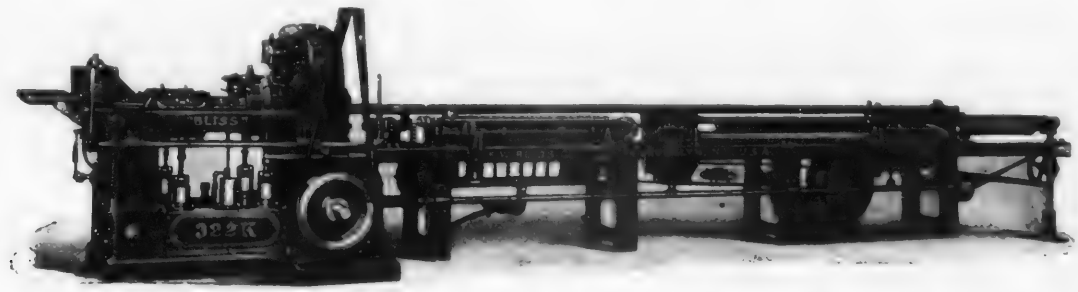
Messrs. Ballard and Co., Ltd., are to be congratulated on their enterprise in so quickly and completely responding to the requirements of the canning industry in this country.

* * *

Soyolk for Meat Preparations.

In sausages, meat pies, meat and fish pastes, galantines, and suchlike goods, the inclusion of Soyolk as a binder has much to commend it, as, while conferring practical assistance to the manufacturer, it also contributes substantially to the food value of the article produced.

Most binders, of course, are of a starchy nature, but Soyolk is a starch-free flour, and its addition to any such foods could hardly be in any way viewed as adulteration.



The Bliss Automatic High-Speed Body-maker described on Page 334 of the November Issue.

Meat Packing Plant.

We reproduce an illustration (Fig. 1) of a steam-jacketed pan made by Israel Newton and Sons, of Bradford, for cooking meats, boiling bones, fat rendering and refining, tripe boiling,

FIG. 1.

and preparing foodstuffs for packing and canning. It is generally made in stainless steel and can be made any size and for any pressure.

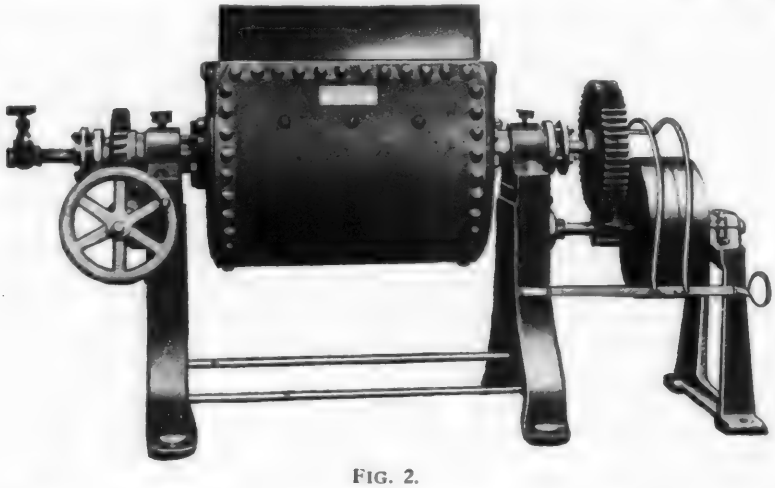


FIG. 2.

Fig. 2 illustrates a semi-circular, steam-jacketed pan which is fitted with stirring gear and tipping gear. These pans have been supplied to potted meat makers and others.

* * *

Confectionery Trade in Jamaica.

Imports of confectionery into Jamaica increased from 550,413 lbs., valued at $110,202 in 1926 to 838,546 lbs., worth $138,255 in 1929, but then decreased to 695,863 lbs., with a value of $119,294 in 1930. Receipts from the United States in 1930 were 277,552 lbs., valued at $35,351. Imports from the United Kingdom amounted to 356,729 lbs., with a value of $68,888. Only one firm in Jamaica manufactures confectionery, its products being lollipops, paradise plums, lemon and pear drops, Turkish delight, caramels, nougat, coated peanuts, and gum drops. The present estimated output of this concern is about 1,500 lbs. per week. This firm has recently engaged a competent confectionery malter, and has engaged two salesmen to cover the island. Locally made hard sweets sell at 1s. per lb.

Hard sweets are popular in Jamaica. Chocolate bars and caramel enjoy a fair demand, while boxed chocolates have a small demand except during the Christmas season.

* * *

Decorated Cans.

At the Imperial Fruit Show, Manchester, considerable attention was directed to the display of decorated and retorted tins printed in seven colours and finished with Retortaline, which were exhibited by Messrs. Robt. Ingham Clark and Co. These containers had been filled and retorted at 212° F. for half an hour, by a reputable firm of packers, under practical working conditions.

Messrs. Robt. Ingham Clark and Co. state that they have, as a result of continued study and experimental work, produced an article to which the trade has been looking forward for many years.

The inks protected by one coat of Retortaline, which were subjected to this considerable temperature, withstood the extreme heat and retained their colours in a marked degree. Further developments in the work pioneered by this firm will be awaited with interest.

* * *

Estimated Production of Filberts.

Total production of unshelled filberts in the Mediterranean basin this year is estimated at 95 per cent. of last year's total crops. Estimated production in the various districts expressed as percentages of last year's crop is as follows: Tarragon, Spain, 260 per cent.; Italy, including both Naples and Sicily, 176 per cent.; and Turkey, 43 per cent., in comparison with last year.

Stocks are probably slightly above those on this date last year. The market continues dull, with prices showing an additional decline for prompt shipment quotations. In view of the probable supply and probable poor demand, particularly from Germany, which is the heaviest buyer, the market for the coming season does not appear encouraging.

* * *

Pressure Retorts.

We illustrate here two useful retorts made by W. J. Fraser and Co., Ltd., of Dagenham.

FIG. 1.

Fig. 1 shows a horizontal, mild steel, riveted autoclave for a high pressure cooking. Charging is done by running in on trucks through a large removable end door. The working pressure may be 100 lbs. per square inch.

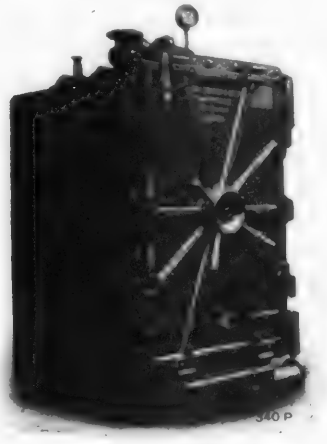


FIG. 2.

Fig. 2 shows a retort for low pressure cooking, in which the material is arranged on trucks or shelves. It is provided with a quick opening door and a series of heaters or gas burners at the base.

New Companies

W. T. AVERY (CONFECTIONERS), LIMITED. (260272.) 17, Victoria Road, Mablethorpe, Lincs. To carry on bus. as bakers, confectioners, etc. Nom. Cap.: £2,000 in £1 shares (1,500 pref. and 500 ord.).

BURSTALL AND DODDS, LIMITED. (260021.) To carry on the bus. of mnfrs. and bottlers of and dlrs. in mineral waters, essences, syrups, etc. Nom. Cap.: £3,000 in £1 shares.

CROSTONS OF BLACKPOOL, LIMITED. (260310.) To carry on the bus. of bakers' sundriesmen, etc. Nom. Cap.: £1,500 in £1 shares.

WILLIAM NELSTROP AND COMPANY, LIMITED. (260082.) To take over the bus. of corn and flour millers and mchts. cd. on at the Albion Corn Mills, Heaton Norris, Lancs, as William Nelstrop and Co. Nom. Cap.: £55,000 in £1 shares.

AMORA SUPPLY COMPANY, LIMITED. (260305.) To carry on the bus. of mnfrs. of and dlrs. in flavouring and other essences, etc. Nom. Cap.: £100 in £1 shares. Dirs.: To be appointed by the subs. Qual. of dirs.: £1.

BAR GUM, LIMITED. (260199.) 166, Rye Lane, Peckham, S.E. 15. To carry on the bus. of mnfrs. of and dlrs. in chewing gum, etc. Nom. Cap.: £4,500 in 4,000 ord. shares of 2s. 6d. and 4,000 pref. of £1.

BARNU TEA COMPANY, LIMITED. (260174.) To carry on the bus. of tea and coffee mchts., etc. Nom. Cap.: £200 in £1 shares.

KILTYKAKES, LIMITED. (260249.) 69, Lincoln's Inn Fields, W.C. 2. To carry on the bus. of biscuit mnfrs., etc. Nom. Cap.: £500 in £1 shares.

M. STANDEVEN, LIMITED. (260186.) To take over the bus. of provision mchts., etc., cd. on at Sowerby Bridge, Yorks, as M. Standeven. Nom. Cap.: £3,500 in £1 shares.

WEST COUNTRY CREAMERY, LIMITED. (259691.) To carry on the bus. of dairymen, etc. Nom. Cap.: £20,200 in £1 shares (10,000 1st pref., 10,000 2nd pref., 99 "A" management, and 101 "B" management).

CONDIMENTS (SALES), LIMITED. (259800.) To enter into an agmt. with the Condiments Company (1930), Ltd., to carry on the bus. of sales agents for the products of that company, etc. Nom. Cap.: £100 in £1 shares.

P. AND E. POTATO MERCHANTS, LIMITED. (259532.) The Goods Depôt, Tooting Junction, S.W. 17. To take over the bus. of a potato mcht., etc., cd. on by A. J. Peacock at Tooting Junction. Nom. Cap.: £500 in £1 shares.

DARRO, LIMITED. (259522.) 7, William Street, Knightsbridge, S.W. 1. To carry on the bus. of confectioners, etc. Nom. Cap.: £200 in £1 shares.

LACTOPHANE (BRITISH HOLDINGS), LIMITED. (259744.) 4, Broad Street Place, E.C. 2. To investigate and test transparent wrapping material mnfrd. from caseine in Great Britain and the British Empire, and particularly to hold an interest in any company formed to mnfre. and deal in such material. Nom. Cap.: £3,000 in 2,850 prefd. ord. shares of £1 and 3,000 ord. of 1s.

CHOCOLATE DELIGHT, LIMITED. (260308.) To carry on the bus. of mnfrs. of and dlrs. in chocolate, etc. Nom. Cap.: £500 in £1 shares.

HYGIENIC ANIMAL FOOD COMPANY, LIMITED. (259680.) To take over the hygienic animal food purveying bus. cd. on at 143, Golder's Green Road, N.W., as Jack and Jill. Nom. Cap.: £1,000 in £1 shares.

KOREBO DELICACY COMPANY, LIMITED. (260264.) To carry on the bus. of mnfrs. and distributors of preserves, etc. Nom. Cap.: £100 in £1 shares.

BENHILL MACHINERY COMPANY, LIMITED. (259761.) To carry on the bus. of mnfrs. of and dlrs. in machinery for moulding, wrapping, packing, and grading provisions, etc. Nom. Cap.: £500 in £1 shares. Dirs.: To be appointed by the subs.

NORTHERN FRUIT BROKERS, LIMITED. (259831.) To carry on the bus. of importers and exporters of and mchts. and dlrs. in fruits, vegetable products, etc. Nom. Cap.: £100 in £1 shares (60 pref. and 40 ord.). Dirs.: To be appointed by the subs. Qual. of dirs.: None required. Remun. of dirs.: As voted by the co.

HARTOG'S MARGARINE WORKS, LIMITED. (259805.) 32, Foster Lane, E.C. 1. To carry on the bus. of mchts. and dlrs. in margarine, etc. Nom. Cap.: £100 in £1 shares. Dirs.: To be appointed by the subs. Qual. of dirs.: None required.

J. K. HUSBAND AND COMPANY, LIMITED. (259589.) 1, Great Tower Street, E.C. 3. To carry on the bus. of provision and produce mchts., etc. Nom. Cap.: £1,100 in 1,000 pref. shares of £1 and 2,000 ord. of 1s. Dirs.: To be appointed by the subs. Qual. of dirs.: £10 shares or stock. Remun. of dirs.: As voted by the co.

ELLARCO PRODUCTS, LIMITED. (259606.) To carry on the bus. of mnfg. and marketing cereal, milk, coffee, and cocoa products or preparations, etc. Nom. Cap.: £100 in £1 shares.

Recent Trade Marks

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal," and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

ZEETA.—522,147. **Substances used as food or as ingredients in food, but not including dried fruits, and canned fruits, canned fish, and not including any goods of a like kind to any of these excluded goods.** JOHN BARKER AND CO., LTD., 83, Kensington High Street, London, W. 8. November 4. (Associated.)

521,441. **A label device bearing a harvest scene and the words "St. Cuthbert's Breakfast Oats." Breakfast Oats.** ST. CUTHBERT'S CO-OPERATIVE ASSOCIATION, LTD., 92, Fountainbridge, Edinburgh. November 4. (By Consent.)

522,637. **An illustration of a horseshoe and the words "Horseshoe Brand." Tapioca, rice, semolina, macaroni, and pearl barley.** BRITISH MERCHANTS INCORPORATED, LTD., 32, Lime Street, London, E.C. 3. November 4. (Associated.) (By Consent.)

VITAMEL.—523,546. **Confectionery.** GILBERT NELSON REEVES, 48, Mark Lane, London, E.C. 3. November 4.

FORREX.—524,856. **Rusks and bread binders for sausages.** JOHN WILLIAM HISLOP, trading as J. W. Hislop and Co., 3, 5, and 7, Moore Place, London Road, Liverpool. November 4.

SUNBONNET.—524,882. **Margarine.** N. KILVERT AND SONS, LTD., Trafford Park Road, Trafford Park, Manchester. November 4. (Associated.)

SAI-SO.—525,907. **Tea.** VINCENT CUNNINGHAM, 59, Priory Road, Anfield, Liverpool. November 4.

NEPTUNE.—525,429. **Preserved fish, fish pastes, and meat pastes.** MACONOCHIE BROS., LTD., Maconochie's Wharf, West Ferry Road, Millwall, London, E. 14. November 4. (Associated.)

EXCELSIOR.—525,846. **Cheese.** C. WRIGHT AND CO. (LONDON), LTD., 71 and 73, St. John Street, West Smithfield, London, E.C. 1. November 4. (Associated.)

JACKETTY.—526,017. **Liquorice sweetmeats.** LIONEL JOHN BROMLEY, trading as Lionel J. Bromley, 41, Barnsole Road, Gillingham, Kent. November 4.

Financial News

(SPECIALLY COMPILED BY S. HOWARD WITHEY, S.F.INT.A.C., F.C.I., ETC.)

The Editor cannot accept responsibility for any errors which may appear in the Financial News Section

BANK RATE (1930–1931)

1930.	February 6	4½ per cent.
,,	March 6	4 ,,
,,	March 20	3½ ,,
,,	May 1	3 ,,
1931.	May 14	2½ ,,
,,	July 23	3½ ,,
,,	July 30	4½ ,,
,,	September 21	6 ,,

In spite of the difficult trading conditions experienced during the past year, **United Dairies, Ltd.**, report a net profit of £548,739 for the twelve months ended June 30 last, as compared with £518,489 realised during the preceding financial year. After adding the sum of £144,914 brought forward from the 1929-1930 account, there was a disposable balance of £693,653, enabling the dividend on the ordinary shares to be increased from 10 per cent. to 11 per cent. Registered in 1915, the company controls some 750 shops and operates numerous creameries and condenseries, the authorised share capital being £5,500,000, of which a total of £5,480,000 has been issued and paid up. General reserve receives £50,000, while £10,000 has been transferred to the reserve for investments other than investments in subsidiary companies, and after reducing the book value of investments in subsidiary companies by £79,850 and allocating the sum of £20,000 to pensions, the balance is carried forward to the next account. The following is a summary of the final appropriation figures relating to the past year :

	£	£
Brought forward from 1929-1930 ...	144,914	
Net Profit—year ended June 30, 1931	548,739	
Disposable Balance ...		£693,653
6% Dividend on £3,250,000 Preference £1 Shares ...		195,000
11% Dividend on £2,230,000 Ordinary £1 Shares ...		245,300
Transferred to Reserve ...		50,000
Transferred to Reserve for Investments ...		10,000
Written off Investments in Subsidiary Companies ...		79,850
Allocated to Pensions ...		20,000
Carried forward to 1931-1932 ...		93,503
		£693,653

Some of the principal balance sheet items are enumerated below :

	June 30, 1931. £
Properties and Furniture ...	2,130,046
Investments in Subsidiaries ...	1,160,155
Owing by Subsidiaries ...	3,331,857
Debtors ...	36,630
Miscellaneous Investments ...	213,661
Cash ...	121,002
Owing to Subsidiaries ...	223,264
Creditors ...	196,238
Reserve Fund ...	550,000
Insurance Fund ...	77,935

At the recent price of 36s. 3d. the ordinary shares yield over 6 per cent. The preference shares are marked at 22s. 3d.

The substantial increase in the output of Trinidad sugar is reflected in the accounts of the **Ste. Madeleine Sugar Co., Ltd.**, covering the twelve months ended June 30 last. During 1929-1930 a loss of £15,685 was sustained, but the result of the past year's trading was a profit of £12,654. Output rose from 31,500 tons to 34,334 tons, but the average price fell from £10 15s. 10d. to £10 5s. 10d. The company was registered in 1920, and has an authorised share capital of £750,000 divided into shares of £1 each, of which £699,585 has been issued and paid up in one class. At June 30, 1930, the profit and loss account showed a debit balance of £10,139, so that, after crediting the balance of profit realised during 1930-1931, £2,515 goes forward to the next account. The following are some of the principal final figures :

	June 30, 1931. £
Total Receipts for Year ...	367,344
Floating Assets ...	16,263
Stocks of Sugar and Molasses ...	122,675
Creditors ...	28,468
Loan from Trinidad Government ...	57,684

The shares were recently priced at 4s. 3d. to 5s. 3d.

During the year to May 31 last a profit of £80,815 was realised by **Chivers and Sons, Ltd.**, which figure compares with £97,021 for the preceding twelve months. Debenture charges amounted to £26,390, consequently net profit worked out at £54,425, to which must be added the sum of £53,974 brought forward from the 1929-1930 account, giving a disposable balance of £108,399 and enabling the ordinary dividend to be maintained at the rate of 5 per cent. This company was registered in 1901, and in 1903 the share capital was increased from £200,000 to £250,000, to £350,000 in 1913, to £450,000 in 1919, to £750,000 in 1923, and further increased in 1926 to £950,000. The total capital ranking for dividends is £798,555, comprising £96,145 in 5 per cent. first cumulative preference shares, £100,000 in 6 per cent. cumulative preference shares, £150,000 in 7 per cent. cumulative preference shares, £300,000 in 7½ per cent. cumulative preference shares, £110,004 in ordinary shares, and £42,406 in workmen's shares, all of £1 denomination. Details of the 1930-1931 appropriation account are summarised below :

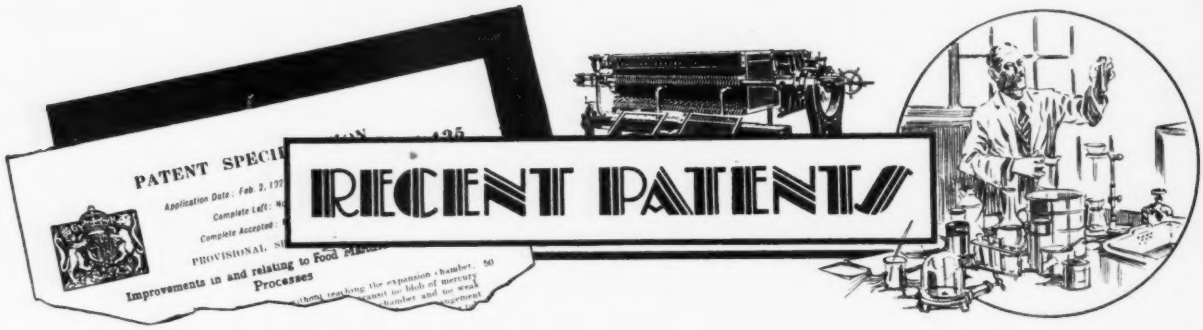
	£	£
Brought forward from 1929-1930 ...	53,974	
Net Profit—year ended May 31, 1931 ...	54,425	
Disposable Balance ...		£108,399
5% Dividend on £96,145 Cumulative Preference £1 Shares ...		4,807
6% Dividend on £100,000 Cumulative Preference £1 Shares ...		6,000
7% Dividend on £150,000 Cumulative Preference £1 Shares ...		10,500
7½% Dividend on £300,000 Cumulative Preference £1 Shares ...		22,500
5% Dividend on £110,004 Ordinary £1 Shares		5,500
5% Dividend on £42,406 Workmen's £1 Shares		2,120
Carried forward to 1931-1932 ...		56,972
		£108,399

In addition to the issued capital, there is £395,560 6 per cent. debenture stock which is marked at 101½, upon which basis the yield is 5·91 per cent.

The accounts submitted by **Pugsley and Wakelin, Ltd.**, the Cardiff millers, cover the sixteen months ended January 31 last, and disclose a profit of £41, which is carried forward. During this financial period the capital has been rearranged and reduced from £100,000 to £64,646, of which a total of £33,926 has been issued and paid up, consisting of £28,926 in the form of 6 per cent. cumulative preference shares of 9s. each and £5,000 in ordinary £1 shares.

STOCK AND SHARE LIST

	Nov., 1931.	*Par Value.*	*Oct.*, 1931.
Aerated Bread : Ord.	19/-	£1	19/3
6½% Pref.	20/-	£1	20/3
Apollinaris : Ord.	5/3	£1	4/6
Assoc. Biscuit : 6½% Pref.	22/3	£1	22/6
Avery (W. and T.) : Ord.	49/6	£1	45/-
5% "A" Pref.	4½	£5	4½
5½% "B" Pref.	20/-	£1	19/6
Benger's Food : Ord.	28/3	£1	28/-
6% Pref.	4⅝	£5	4⅝
Bovril : Ord.	24/3	£1	24/-
Deferred	34/3	£1	34/6
6% Pref.	22/-	£1	22/6
4½% Deb.	90½	£100	92
British Aluminium : Ord.	30/6	£1	27/6
6% Pref.	17/9	£1	19/6
British Thomson Houston : 7% Pref.	23/-	£1	22/6
Bucknall (H.) and Sons : Ord.	13/9	£5	23/9
Cadbury : 6% Pref.	23/6	£1	23/3
8% 2nd Pref.	27/6	£1	27/6
Callard, Stewart and Watt : 6% Pref.	16/8	£1	16/9
Carrs : 6½% Pref.	18/6	£1	18/9
Cerebos : Ord.	6½	£1	6
Chivers : 6% Deb.	101½	£100	101½
Cinzano : 7½% Pref.	20/6	£1	20/9
Clark's Bread : Ord.	21/6	10/-	21/3
Cow and Gate : 7½% Pref.	22/3	£1	22/6
Criterion Restaurants : Ord.	7/-	5/-	6/9
Crosse and Blackwell : Ord.	1/-	1/-	11d.
7½% Pref.	6/-	15/-	4/-
6½% Deb.	73	£100	77¾
Dutch Margarine : 5½% Pref.	19/-	£1	20/9
English and Dutch Meat : 8% Deb.	52	£100	52
Ewart and Son : Ord.	11/3	5/-	10/6
16% Pref.	18/9	10/-	19/-
Foster Clark : Ord.	33/9	10/-	33/6
Fry's : 8% "B" Preferred	22/9	£1	22/9
Fullers : Ord.	35/3	£1	35/-
7% Pref.	21/3	£1	21/6
Gordon Hotels : Ord.	5/6	£1	4/6
4% Perp. Deb.	67	£100	66½
H.P. Sauce : Ord.	92/6	£1	82/6
Hill (W.) : Ord.	6/-	£1	5/9
Holbrooks : Ord.	13/-	5/-	12/6
5% Pref.	4½	£5	4½
Home and Colonial : Ord.	13/7	4/-	13/6
15% Cum. Ord.	42/6	£1	45/7
6% Cum. Pref.	5⅓	£5	5⅜
Honywood Hotels : Ord.	4d.	2/6	3d.
8% Pref.	9/3	£1	9/6
Hovis : 6% Cum. Pref.	22/7	£1	22/6
Imperial Chemical : Ord.	18/-	£1	13/6
Deferred	6/-	10/-	3/3
7% Cum. Pref.	20/9	£1	18/4
International Tea : Ord.	21/3	5/-	20/-
6% 1st Pref.	23/3	£1	22/6
7% "A" Pref.	24/-	£1	25/-
Jones (R. E.) : Ord.	1/3	5/-	1/6
10% Pref.	6/6	£1	6/9
Jurgens : 7% Cum. Partg. Pref.	22/3	£1	20/-
Kia-Ora : Ord.	7/3	10/-	7/-
Liebigs : (Reg.)	8¼	£5	9
(Bearer)	8¼	£5	8¼
5% Pref.	82/6	£5	92/3
Lipton : Ord.	6/-	1/-	5/9
5% 1st Pref.	8/6	10/-	8/6
6% Pref.	11/6	10/-	11/3
6% Deb.	100	£100	102½
Lovell and Christmas : Ord.	15/6	£1	13/-
Lyons : Ord.	98/-	£1	97/6
"A" Ord.	97/6	£1	95/3
5% Pref.	21/3	£1	21/-
6% Preferred Ord.	22/6	£1	22/3
7% Pref.	25/3	£1	25/-
8% Pref.	28/-	£1	28/3
Manbre and Garton : D'f'd.	13/9	2/-	10/8
Mather and Platt : Ord.	28/-	£1	24/6
Maypole Dairy : 20% Preferred	15/6	5/-	16/9
Deferred	4/2	2/-	4/-
5% Pref.	18/3	£1	19/3
Mazawattee Tea : Ord.	11/4	6/8	11/3
Meadow Dairy : 7½% Pref.	23/-	£1	23/9
Mellin's Food : 6% Cum. Pref.	2/6	£1	2/6
Molassine : 7% Pref.	13/2	15/-	11/9
Nathan (J.) : Ord.	1/4	1/-	1/3
7% Pref.	14/8	£1	14/9
8% Preferred	4/9	10/-	5/9
Nestlés : 8% Pref.	26/9	£1	24/-
Parkinson and Cowan : Pref.	16/4	£1	16/3
Pascall (J.) : 8% Preferred	1/8	£1	1/6
Peak Frean : 5% Pref.	18/6	£1	18/9
8% "A" Pref.	23/6	£1	26/-
Radcliffs Edible : Ord.	1/4	1/-	1/3
8% Pref.	7/-	10/-	7/-
Radiation : Ord.	35/3	£1	32/6
6% Pref.	21/-	£1	21/6
Rowntree : 7% 2nd Pref.	21/3	£1	21/6
Salt Union : Ord.	28/6	£1	23/2
7% Pref.	24/3	£1	24/6
4½% Deb.	79	£100	83
Schweppes : Deferred	22/9	£1	18/8
4% Deb.	78	£100	77
Scribbans : Ord.	13/6	£1	12/9
Deferred	2/-	1/-	1/10
Slaters and Bodega : Ord.	25/-	£1	26/-
6½% 2nd Pref.	20/-	£1	20/3
Smithfield and Argentine Meat : 7½% Cum. Pref.	14/10	£1	15/6
Smith's Potato Crisps : Ord.	7/3	5/-	6/4
Spiers and Pond : Ord.	12/3	10/-	11/3
6½% Pref.	17/6	£1	20/9
5% Deb.	95½	£100	96
Spillers : Ord.	32/3	£1	29/-
6% Pref.	20/6	£1	20/9
Deferred	14/3	£1	12/-
Strand Hotel : Pref'd. Ord.	63/6	£1	63/6
Tate and Lyle : Ord.	39/6	£1	38/-
6½% Pref.	23/-	£1	23/9
Trust Houses : Ord.	14/6	£1	14/-
Unilever : Ord.	31/-	£1	27/9
7% Preferred	22/7	£1	21/3
Union Cold Storage : 6% Pref.	18/6	£1	18/-
7% Pref.	20/-	£1	18/9
10% Pref.	24/6	£1	24/-
United Caterers : Ord.	10d.	5/-	9d.
United Dairies : Ord.	36/3	£1	34/-
6% Pref.	22/3	£1	21/-
United Glass Bottle : Ord.	24/-	£1	18/-
Preferred	25/-	£1	23/-
United Molasses : Ord.	8/3	£1	6/6
6% Pref.	8/7	£1	9/-
Van den Berghs : 15% Preferred Ord.	9/9	5/-	8/6
Victoria Wine : Ord.	5/-	5/-	5/-
8% Pref.	20/3	£1	20/2



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Latest Patent Applications

29971. BLINCOW, J. E.: Ovens for steaming hams, etc. October 29.

29632. BOSURGI, G.: Preparation of vitamin natural salts in jelly and jams. October 26.

30042. BRITISH DRUG HOUSES, LTD., and JEWELL, W.: Preparation of vitamin concentrates. October 29.

28470. CAMBIO PRODUCTS, LTD., and MACCURDY, J. T.: Manufacture of vitamin-containing edible products. October 13.

28573. KAWAI, K.: Method of preparing liver oil. October 14.

Specifications Published

359,005. ZAROTSCHENZEFF, M. T., and LIVERPOOL REFRIGERATION CO., LTD.: Preserving, packing, and treating foodstuffs.

359,059. HELLERUD, R.: Process for the manufacture and preservation of that class of milk products in which milk is mixed with vegetable fats.

359,306. ANTHONISEN, N., and INGEBERG, H. C. M.: Method of drying fresh and salted fish.

359,332. MAHONY, W. J.: Beaters for foodstuffs.

358,610. SHARIT CHEMICAL CO., INC.: Method of preparing a therapeutic compound.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts Published

Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued, on payment of a subscription of 5s. per group volume, or in bound volumes price 2s. each.

354,791. **Tea manufacture.** MAIN, J. A., Clydesdale Ironworks, Possilpark, Glasgow.

The fresh leaf is treated before the withering process by allowing it to fall through an upward current of air in a tube. The air is supplied by pipe and may be treated to dry and/or cool the leaf. The tea is sorted by the air current into coarse and fine grades, the coarse particles being supported by the air, while the fine falls and is graded by a pivoted plate on to a conveyor. The plate may be moved into the full-line position to permit the coarse grade to fall on to a conveyor.

354,766. **Beverages.** HASELBACH, A., Namslaw, Silesia, Germany. Beers poor in alcohol are prepared from wort, having about double the addition of hops usual with top fermenting beers—for example, 2 lbs. instead of 1 lb. of hops to each pound of malt. The wort is fermented for a normal length of time with top fermenting yeast and is allowed to stand for the normal time. The wort may be prepared from only one-half the usual amount of malt, but with the customary amount of hops. Shortly before bottling the beer may receive an addition of sugar, preferably in the form of starch syrup, and is then sterilised and filtered. After repeated use the yeast becomes immune to the retarding influence of the increased amount of hops, and should be replaced by one from a wort poor in hops. Examples are given.

354,535. **Preserved milk or cream preparations.** FROHRING, W. O., 14518, Shaker Boulevard, Shaker Heights, Ohio, U.S.A.

A preserved milk or cream preparation for table use is obtained by separating from whole milk a cream of high fat content, adding to the cream a small amount—*e.g.*, about 1 per cent. by weight—of sodium or other alkaline caseinate, reducing the fat content of the mixture to the desired value—*e.g.*, about 18 per cent.—by addition of a sufficient quantity of milk, pasteurising the product, and finally sealing it in tins or other containers and sterilising. The milk added may be whole milk or skim milk from the whole milk originally used. To improve the flavour and prevent coagulation, a small quantity of a suitable agent such as sodium citrate may be added. Pasteurisation is effected by heating in bulk at 142° to 145° F. for about thirty minutes, and may be carried out before or after the addition of the milk. The produce is homogenised at this temperature, employing the usual pressures—*e.g.*, 2,500 to 2,800 lbs. per square inch. The final sterilisation of the canned product is effected by heating at 240° to 242° F.

352,608. **Food preparations.** SIREK, J., Jince, Czecho-Slovakia.

A colloidal solution of calcium in whey free from lactalbumen and milk ferments for use in the manufacture of meat extracts and other food products is obtained by first removing part of the casein by adding magnesium sulphate and phosphoric acid, and then the remainder by neutralisation of the phosphoric acid with magnesium carbonate. Sufficient caustic soda solution is then added to the casein-free liquid, followed by boiling, to convert the lactalbumen and lactoglobulin into albumenates which are precipitated by addition of phosphoric acid and repeated boiling and removed by filtration. The liquid is then neutralised with magnesium carbonate and, after addition of lime-water with stirring, boiled again. Hemp seed is extracted at above 57° C. with the whey so obtained, and the extract is neutralised with phosphoric acid, brought to the boil, filtered at above 57° C., and is then boiled with gradual addition of sugar to a syrup. A specific example, including proportions used, is given.

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